CENTRAL WATERFRONT TRANSPORTATION STUDY

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CENTRAL WATERFRONT TRANSPORTATION STUDY

(1) Introduction

Metropolitan Toronto Council at its meeting held on October 27, 1981, adopted Clause No. 4 of Report No. 14 of the Economic Development and Planning Committee, "City of Toronto Official Plan Amendment No. 147 and By-law No. 569-80 for the Harbourfront Lands", with the following amendment recommended by the Metropolitan Executive Committee:

> "that the Transportation Committee examine and report on a total road and transit network for the area."

The Metropolitan Transportation Committee requested that the Commissioner of Roads and Traffic submit a report to the Transportation Committee on a total road and transit network for the (Central Waterfront) area.

At its meeting of April 26, 1983 Metropolitan Council, in considering Clause No. 1 of Report No. 6 of the Economic Development and Planning Committee dealing with the Metro/TTC Rapid Transit Study, also adopted the following recommendation of the Executive Committee:

> "that the Commissioner of Planning, the Commissioner of Roads and Traffic, the Executive Director of Economic Development and the Chief General Manager, Toronto Transit Commission be requested to bring forward to the Economic Development and Planning Committee study proposals for waterfront transit"

In response to the above requests, the attached report has been prepared by the Metropolitan Toronto Planning Department in cooperation with the Metropolitan Roads and Traffic Department and the Toronto Transit Commission. The objectives of the report are:

(i) to identify and priorize the necessary improvements to be made to the road and transit system in order to accommodate the travel demands of existing, committed and proposed development in the Central Waterfront area; and

(ii) to recommend an overall transportation plan for the Central Waterfront area.

(2) Background

Several studies have been undertaken over the past few years dealing with development in the Central Waterfront area in which many proposed transportation improvements have been recommended. The major transportation studies and include the following:

(a) South Parkdale Decking Study

Following a City of Toronto proposal to build new housing between the southern edge of South Parkdale and Lake Shore Boulevard between Dufferin Street and Dowling Avenue for predominantly medium density development, DeLCan completed a study in January 1981 for the City of Toronto which examined the feasibility and cost of decking over the railway tracks and the Gardiner/Lake Shore road facilities west of Dufferin Street. This would free up Metro-owned lands for residential development; the revenues from the sale of the lands and from air rights hopefully would offset the roadway relocation costs.

This study examined the following roadway alterations:

(i) creating a new interchange between the Gardiner Expressway and Dufferin Street and eliminating the existing connections between Lake Shore Boulevard, the Gardiner Expressway, Jameson Avenue and Dunn Avenue:

(ii) joining together the eastbound and westbound lanes of Lake Shore Boulevard west of Exhibition Place, in an alignment immediately adjacent to the Gardiner Expressway.

Since the results and recommendations of many of these studies are inter-related, this study has been undertaken to combine the findings of the various analyses and recommend an overall transportation plan for the entire area. Specifically, the study objectives were as follows:

(b) Harbourfront Transportation Study

The Harbourfront Corporation retained the consulting firm of DeLCan to conduct a transportation study in relation to the proposed development in the Harbourfront area, The consultants submitted two reports, "Harbourfront Transportation Study: Part 1 Report" and "Harbourfront Transportation Study, Road Concept Submissions: Queen's Quay Extension" in July 1981.

The Harbourfront Transportation Study analyzed not only the possible impacts of the proposed development on the existing road and transit system, but also assessed the impacts of the full development of Harbour Square. It is recommended various physical improvements and traffic control strategies, and concluded that, with these improvements, the transportation network would be able to accommodate the future travel demand generated by the Harbourfront and Harbour Square developments at an acceptable level of service.

Following a review of the Harbourfront study reports, Metro and the TTC staff concluded that the development could not be adequately served by the proposed road and transit improvements. It was estimated that after the full development of Harbourfront and the adjacent Harbour Square, there would be no excess road capacity available in the Gardiner/Lake Shore corridor to the west and that the proposed bus service to Union Station via York Street would not be adequate for the projected transit demand. Therefore, it was recommended that approval of approximately 49,000 sq.m of the total proposed office development be deferred.It was further recommended that "appropriate right-of-way for a possible Intermediate Capacity Transit System (I.C.T.S.) or other transit service be identified and protected within Harbourfront lands due to the need for the resolution of a satisfactory transit plan in the area to adequately serve the development of Harbourfront".

(c) Railway Lands Access Study

During Phase I of the Railway Lands Access Study, transportation data had been collected and analyzed in 1979 by staff of the Metro Planning and Roads and Traffic Departments to define the existing operating conditions of the Railway Lands area. The second Phase of this study was conducted by Read, Vorhees and Associates and analyzed the access opportunities and development potential for the Lands. The Phase II report dated October 1981 identified the physical locations of road access and the scale of development based on access capacity. The report, however, was not intended to address the adequacy of road and transit improvements beyond the study area itself.

Following completion of the Phase II report of the Railway Lands Access Study, Marathon and CN Real Estate retained consultants to prepare Part II land use plans. In September, 1982, C.N. Real Estate

submitted a series of reports prepared by the I.B.I.Group to the City of Toronto Planning and Development Department. One of these reports is entitled "Access to the CN-Railway Lands Development" and it is recognized in this report that a Spadina L.R.T. line would be needed to serve the proposed development in the CN-Railway Lands. The submission of CN Real Estate is now being reviewed by the City of Toronto and comments from Metro and the TTC have been requested.

(d) Metro/TTC Rapid Transit Study (A.R.T.S.)

In June, 1982, a report on the Metro/TTC Rapid Transit Study (A.R.T.S.) was submitted to the Economic Development and Planning Committee forwarding a summary report and six background reports. At its meeting held on April 26, 1983 Metropolitan Council adopted Clause No.1 of Report No.6 of the Economic Development and Planning Committee as amended which contained a recommendation that the Technical Transportation Planning Committee be authorized to undertake a feasibility study for a rapid transit 'relief' line from Union Station to the Danforth subway in the vicinity of the Greenwood yards, such study to be combined with a feasibility study of the proposed Waterfront line from Union Station to Exhibition Place and its extension north-westerly to the Bloor subway.

Background Report No.6 entitled "Waterfront and Central Area Options" identified and evaluated various options and possible configurations for a future Waterfront rapid transit facility and also examined possible system-wide impacts of such a facility. This report concluded that:

- a waterfront rapid trnsit facility by itself would concentrate more demand on Union Station and increase peak hour congestion on the Yonge subway and at the Bloor/Yonge transfer station to unacceptable levels;

- a waterfront rapid transit "line" would be more cost effective than a "loop"; it would also be easier to integrate with a future radial rapid transit line;
- a waterfront rapid transit facility with the radial line would provide relief at the congestion points of the existing transit system, but it would require major capital expenditures;
- a waterfront rapit transit facility combined with surface transit improvements (such as the Spadina LRT,Sherbourne express bus and others) could be the most cost effective option if proven feasible. This option would not preclude the construction of a radial line in the future. Depending on the effectiveness of surface transit improvements, the eastern part of the radial line between Union Station and the Donlands subway station (Relief Line) might be required.

(e) Feasibility Study on Covered Stadium and Trade Centre at Exhibition Place

A Feasibility study is currently underway by Currie Coopers and Lybrand to assess the appropriateness of the Exhibition Place location for a world class international trade fair and exhibit complex and multi-use sports complex. As part of this current study, M.M. Dillon Limited is conducting an analysis of the access and parking requirements for the proposed facilities.

(f) Other Related Studies

A number of other site specific transportation related studies which have been conducted during the past few years in the Waterfront area are listed below:

- "Report on Access Investigations for the World Trade Centre Development" conducted for the Toronto Harbour Commission by M.M. Dillon, October, 1979;

- "Route Feasibility Study - I.C.T.S. Spadina and Bathurst Quays" conducted for the Harbourfront Corporation by M.M. Dillon Limited, September, 1982;

- "Toronto Island Airport Access Study" by Access Study Group - conducted for the Joint Coordinating Committee for Toronto Island Airport Development, October, 1982;

In addition, a pre-feasibility study for a Spadina L.R.T. line has just recently been completed by the I.B.I. Group. This study was funded jointly by CN Real Estate, the Harbourfront Corporation, the Toronto Harbour Commission and the Campeau Corporation.

(3) Study Objectives and Approach

As explained briefly in the previous section, various studies carried out independently have indicated that potential development in the Central Waterfront area would have significant impacts on the road and transit systems. Since the results and recommendations of many of these studies are inter-related, this study has been undertaken to combine the findings of the various analyses and recommended an overall transportation plan for the entire area. Specifically, the study objectives were as follows:

- to maintain adequate access to the Central Area and particularly the Financial District;
- to improve public transit to Harbourfront, the Islands ferry dock and other waterfront activities;
- to provide access suitable for the emerging proposals for a redeveloped Exhibition Place; and
- to provide sufficient access to allow the development of the Railway Lands and the remainder of Harbourfront.

The study area was defined as the area south of Front Street and the Lake Shore rail corridor between a line east of Yonge Street and Dowling Avenue, as shown in Figure 1. The Central Waterfront transportation plan presented in this report includes proposals for new and improved links to and within this study area.

From a travel demand point of view, proposed office development projects in the Railway Lands, Harbourfront and Central Bayfront are the major potential peak hour trip generators. Existing commitments for the CP portion of the Railway Lands alone permits over half a million sq.m of office space. The recently submitted proposal for the Railway Lands also includes over half a million sq.m of office space on the CN lands. Other proposals in the eastern part of the study area (Harbourfront, Harbour Square and the Harbour Commission Lands) would create an additional 300,000 sq.m of office space development. Based on an assumed floor space/worker ratio of 25.5 sq.m/employee, about 60,000 jobs could be accommodated by this proposed new office space. Accordingly, the impact of the additional work trips attracted to the study area will be the most critical factor in determining the required road and transit improvements. In addition, there will be a considerable amount of new office space coming on stream north of Front Street (in the financial district area) which will create additional demands on the transportation system, mainly the subways, and this has been considered as new background traffic. The road and transit improvements which form part of the overall transportation plan have been recommended on the basis of their ability to serve both Central Waterfront and additional downtown trips.

Since the impact of the additional office work trips on the transportation system would correspond to various stages of development, the required transportation improvements have been analyzed for four development levels as follows:

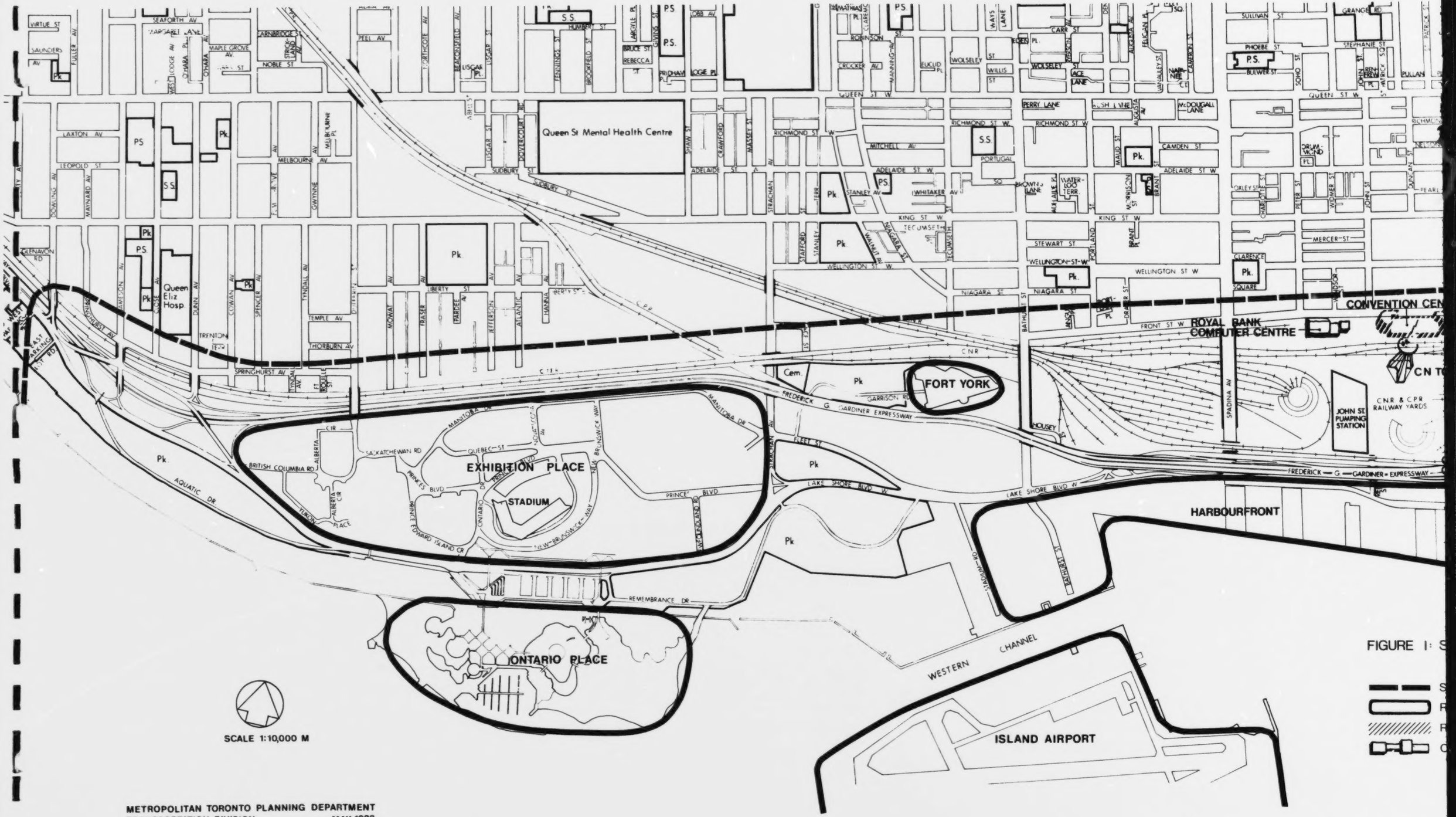

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FIGURE 1: S

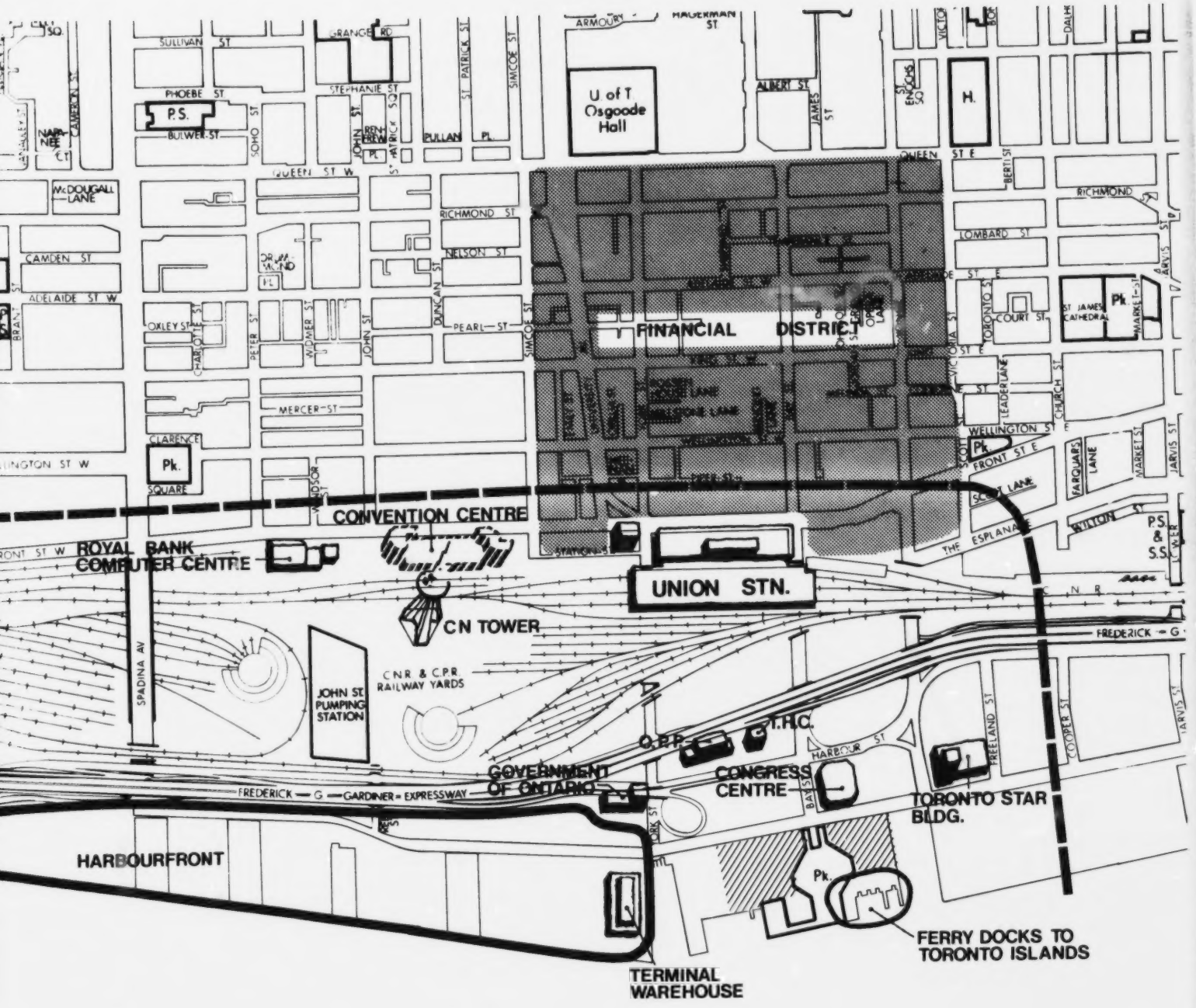

FIGURE 1: STUDY AREA AND EXISTING DEVELOPMENT

STUDY AREA

RECREATIONAL USES AND ACTIVITY CENTRES

RESIDENTIAL / HOTEL

OFFICE BUILDINGS

Development Level A

- includes existing development plus those developments under construction as of January 1, 1983;

Development Level B

- assumes Development Level A, plus the development of all other parcels for which current zoning would permit development including certain active proposals; but excluding parcels which could possibly be redeveloped to a higher density;

Development Level C

- assumes Development Level B, plus the development of the portion of Harbourfront not yet approved, and the CP (Marathon) part of the Railway Lands (currently committeed by the City of Toronto's Central Area Plan);

Development Level D

- assumes Development Level C, plus development of the CN part of the Railway Lands.

For each development level mentioned above, additional work trips generated to the study area as well as to the financial district area have been estimated. Impacts on the existing road and transit systems have then been estimated and alternative improvements evaluated.

Regarding the western part of the study area,access to the Exhibition Place area has been an important transportation issue in Metropolitan Toronto during the past few years. With the construction of a covered statium and an international Trade Centre complex,adequate access to Exhibition Place would become of greater importance.While the required road and transit improvements have been determined predominantly on the basis of need to accommodate the additional work trips generated by the new office developments, the need for transportation improvements to Exhibition Place has also been addressed. In addition, alterations to the transportation facilities west of Exhibition Place (i.e. Lake Shore Boulevard and the Gardiner Expressway) have been given further consideration.

The various road improvement options presented in this report have been developed and assessed by the Metropolitan Roads and Traffic Department, while staff of the Toronto Transit Commission developed and assessed transit improvement options including alignments for a future Waterfront I.C.T.S. facility. Separate background reports detailing this work are available from the respective agency.[1,2]

(4) Existing Development and Travel Characteristics

(a) Existing Development

The Central Waterfront area offers a variety of recreational uses and activities at present. The Toronto Islands, Harbourfront, CN Tower, Ontario Place, Exhibition Place and the Stadium are the major activity centres. The Harbour Square complex located at the foot of Bay Street includes the Hilton Hotel, Congress Centre and the condominium complex. Existing office buildings located south of the railway corridor include the Toronto Star and the Toronto Harbour Commission buildings. Figure 1 shows the existing development.

As shown in Figure 2, the total amount of office floor space completed and under construction in the Central Core Area of Metropolitan Toronto (area bounded roughly by Davenport Road, University Avenue, Jarvis Street and Lake Ontario) was 5,301,800 sq. m as of January 1, 1981. This is 498,200 sq. m less than the 1981 review limit of 5,800,000 sq m^3 as set out in the City's Central Area Plan. Within the Financial District (south of Queen Street), the amount of office floor space completed and under construction as of the same date was 2,567,100 sq.m. The average amount of office space per

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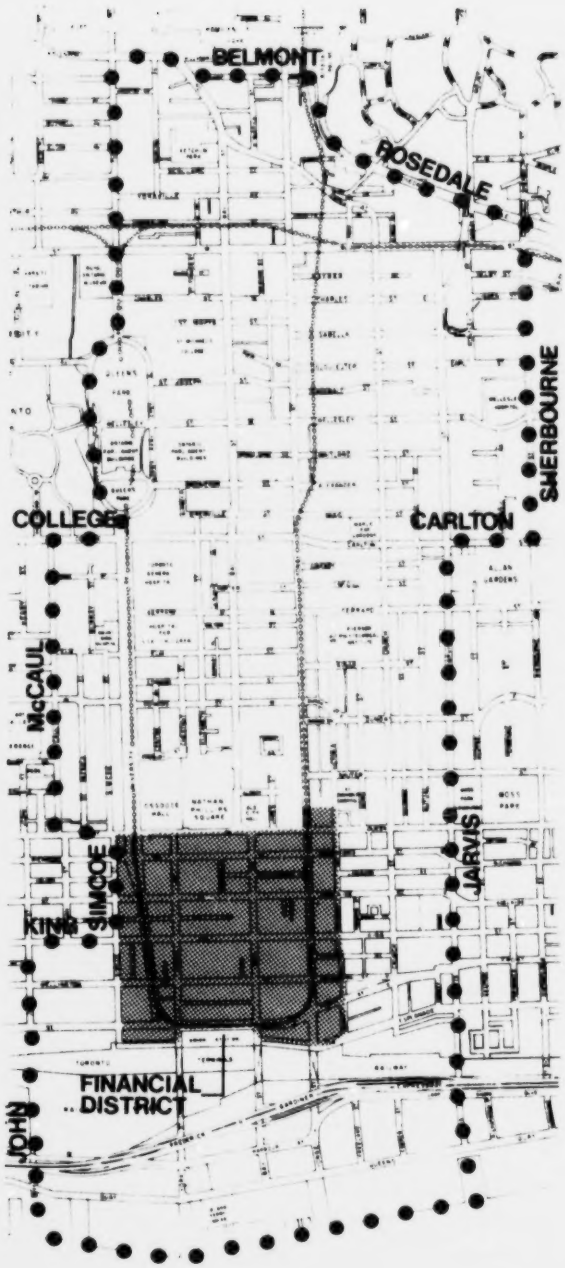
1. "Metropolitan Roads Review, Lake Shore Transportation Corridor", Metropolitan Roads and Traffic Department, January, 1983.
2. "Central Waterfront Area Transit Plan", Toronto Transit Commission, April, 1983
3. "1981 Quinquennial Review", City of Toronto Planning and Development Department, October, 1981.



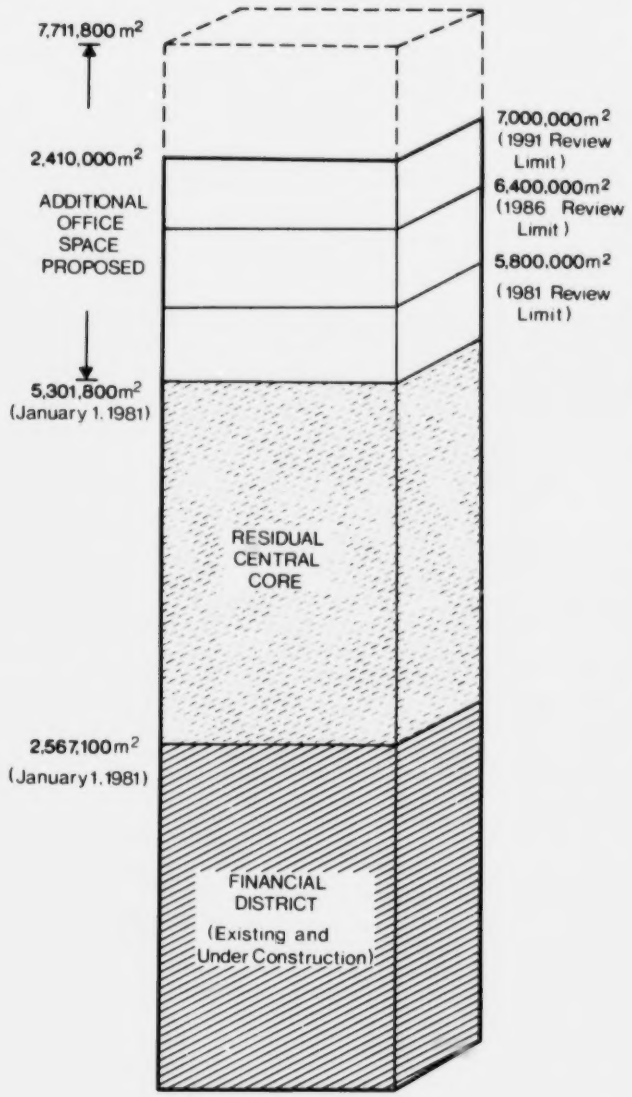


FIGURE 2 :
COMPARISON OF EXISTING AND POTENTIAL OFFICE SPACE IN THE CENTRAL CORE WITH REVIEW LIMITS

worker (FSW) has been increasing slightly within the Central Core over the past years. In 1975, the average FSW in office buildings in the Central Core was 22.9 sq. m/employee, according to a report prepared by the IBI Group. The 1980 office employment survey conducted by the City Planning and Development Department showed that this ratio has increased to 25.8 sq. m/employee. In prestige offices, this figure will tend to rise, however, as a long range planning tool, the average appears to be valid.

(b) Existing Travel Characteristics

A comprehensive set of traffic counts taken in 1979 during the Railway Lands Access Study -Phase I best reflect the existing traffic conditions in the Railway Lands area. According to the study results, the majority of the intersections and ramps to and from the Gardiner Expressway have theoretical Volume/Capacity (V/C) ratios over 0.80 and in many cases over 1.0. It appears that with increased traffic volumes, a.m. and p.m. peak hours have become prolonged as almost 3-hour periods. The major peak hour traffic flows are concentrated on the Gardiner Expressway and Lake Shore Boulevard. The main direction of flow in the a.m. peak period is from the Gardiner/Lake Shore corridor into the downtown and in the reverse direction during the p.m. peak period. It was estimated that approximately 27% of the westbound and 52% of the eastbound p.m. peak hour traffic on the Gardiner Expressway at Bathurst and Jarvis Streets respectively are through traffic which have neither origin nor destination within the downtown area.

Surface transit routes serving the area are designed primarily to accommodate peak point demands outside the Central Waterfront area. Since frequency of service is determined by peak point demand, the routes entering the area are generally operating well below their design capacity. While this is primarily due to the current low level of work trip travel into this area, it also reflects the relatively poor connections

to the subway system.

Cordon Counts taken every two years between 1975 and 1981 as part of the Metropolitan Cordon count program have shown some increases in the total number of person trips crossing the cordon line around the Downtown Core. However, the majority of these are attributed to the increases in transit trips and especially in GO rail trips. Table 1 shows the changes between 1975 and 1981 in vehicle and person trips crossing the cordon line around the Downtown Core which is the area bounded by University Avenue, Jarvis Street, Front Street and Dundas Street. As can be seen from Table 1, total transit modal split, including both TTC and GO services for outbound trips during the p.m. peak period across the Downtown Core has increased from 67.7% in 1975 to 72.8% in 1981. While GO transit ridership has increased significantly in percentage terms, from 8.0% to 14.4%, the absolute increase of about 18,800 transit trips is distributed evenly between TTC and GO services, with about 9,800 additional TTC trips and 9,000 additional GO trips. Ridership on the Yonge subway (south of College Station), has shown a 17.2% increase between 1975 and 1981 in the northbound direction during the p.m. peak hour. Ridership on the University subway (south of Queen's Park Station) has increased by 37.2% in the north-bound direction during the same period. From TTC ridership counts, 1981 peak hour ridership on the Yonge subway south of Bloor Street was approximately 35,200 in the heavy direction. It should be noted that 1982 peak hour ridership declined slightly. However, this decline is attributed to increased unemployment associated with the continuing economic recession and is expected to be temporary. It is generally accepted that the Yonge subway is already operating at its practical capacity. While the number of auto vehicle and person trips did not show a significant change between 1975 and 1981, the cordon counts have revealed that the auto occupancy rate has declined slightly between 1975 and 1981 across each cordon.

TABLE 1

PERSON AND VEHICLE TRIPS ACROSS THE DOWNTOWN CORE BETWEEN 1975 AND 1981

PERSON TRIPS
P.M. PEAK PERIOD 4:00 - 6:00 P.M.
(OUTBOUND)

Year	Total Persons	Auto		TTC		GO Train		Total Transit	
		No.	%	No.	%	No.	%	No.	%
1975	99,592	32,119	32.3	59,472	59.7	8,001	8.0	67,473	67.7
1977	111,119	33,560	30.2	66,974	60.3	10,585	9.5	77,559	69.8
1979	106,642	34,051	32.0	58,690	55.2	13,901	12.8	72,591	68.1
1981	118,555	32,278	27.2	69,257	58.4	17,020	14.4	86,277	72.8

VEHICLE TRIPS
P.M. PEAK PERIOD 4:00 - 6:00 P.M.
(OUTBOUND)

Year	Total Vehicles	Auto		Trucks		Transit Vehicles	
		No.	%	No.	%	No.	%
1975	24,846	22,489	90.5	1,709	6.9	648	2.6
1977	26,223	23,841	90.9	1,718	6.6	664	2.5
1979	27,104	24,404	90.0	2,055	7.6	645	2.4
1981	26,094	23,522	90.1	2,057	7.9	515	2.0

Source: 1981 Metropolitan Cordon Count Program

(5) Future Development

The scale of future commercial and residential development in the Central Waterfront area has been estimated based on information provided by the City of Toronto Planning and Development Department. These estimates have been for 3 categories of project status; under construction, zoning in place and active proposals, and uncommitted. Potential office development projects for these categories in the Central Waterfront area are listed in Table 2; the location of these major projects is shown in Figure 3. As mentioned previously, development of the Railway Lands has been split into two development levels (CP included in C; CN included in D) since the magnitude of the development of the entire lands is so great and since commitments through the Central Area Plan of the City of Toronto have already been made for the commercial development of the CP Lands. Figure 4 shows schematically the assumed growth by development level. As can be seen from Table 2, the amount of potential office space south of Front Street alone is over 1.5 million sq. m. This represents approximately a 27% increase over the existing office space within the whole Central Core Area of the City of Toronto.[1] The figures do not include estimates of redevelopment of sites which are currently under developed in terms of their maximum present zoning.

In addition, as shown in Figure 4, a total of 887,099 sq. m. of office development is either under construction, has zoning in place or has an active proposal in areas north of Front Street. This is also a significant amount of additional office development for Downtown Toronto.

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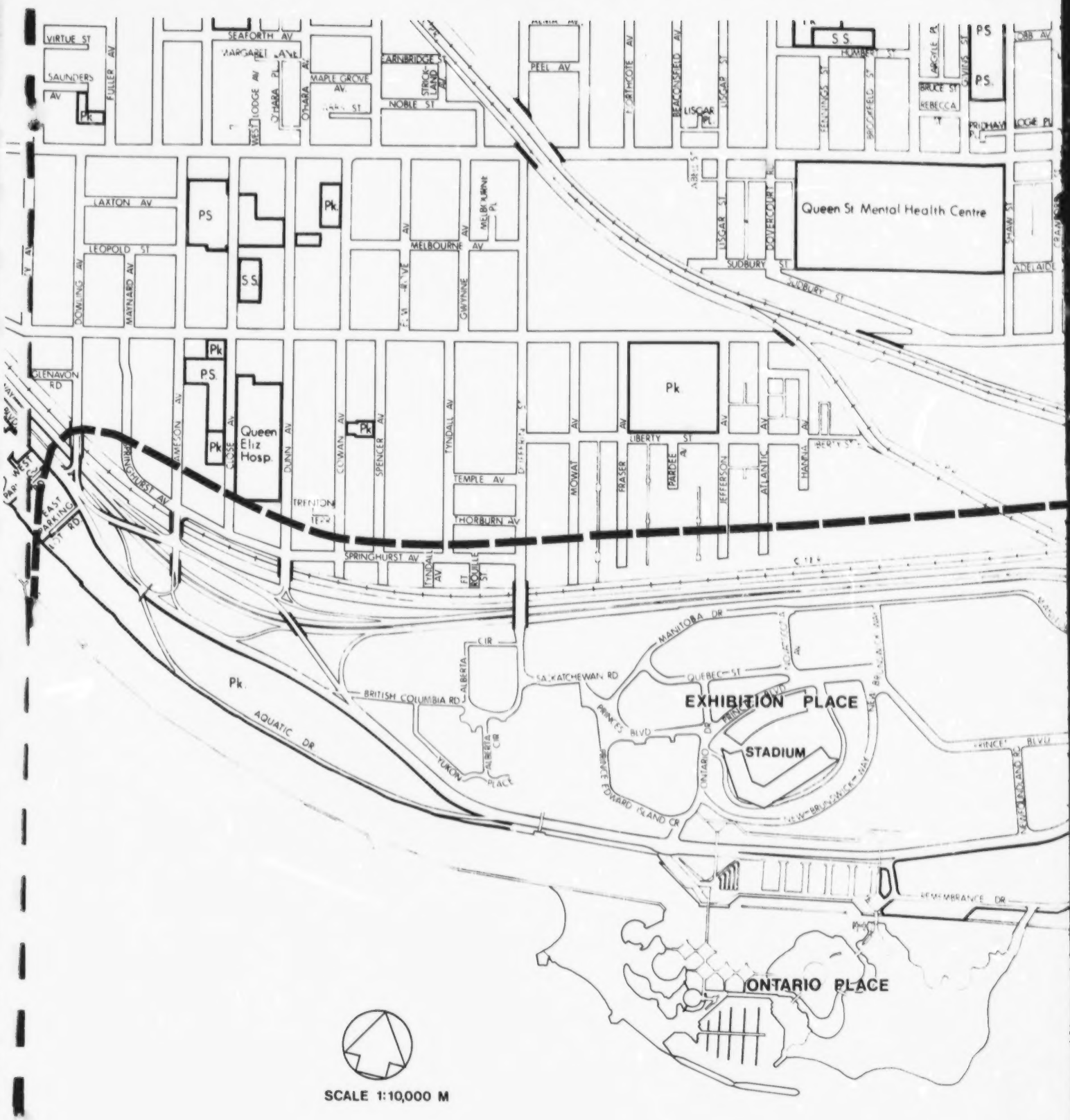
1. Total office space existing and under construction as of January 1, 1982 is 5,599,100 sq.m (City Monitor 82, Volume 1, September, 1982).

TABLE 2
POTENTIAL OFFICE DEVELOPMENTS AND WORK TRIPS GENERATED

Additional Office Developments	Office Space (sq.m)	No. of Employees[1]	Total Person Trips[2] (peak hr.)	Transit Modal Split (%)	Transit Person Trips	Auto Person Trips	Auto Vehicle Trips
Development Level A							
. Royal Bank Computer Centre	58,300	2,286	1,132	60	679	453	348
. Convention Centre	23,690	929	460	65	299	161	124
. Marathon Building	30,300	1,188	588	80	470	118	91
. Terminal Warehouse	36,265	1,422	704	60	422	282	217
. North of Front Street to Queen Street	(290,000)	11,480	5,683	80	4,546	1,137	875
TOTALS	(440,000)	17,305	8,567	-	6,416	2,151	1,655
Development Level B							
. Harbourfront Ph I	66,155	2,594	1,284	60	770	514	395
. Harbour Square[3]	142,600	5,592	2,768	65	1,799	969	745
. Harbour Commission Lands	86,954	3,410	1,688	65	1,097	591	455
. North of Front Street to Queen Street[3,4]	(595,000)	23,308	11,537	80	9,230	2,307	1,774
TOTALS (Cumulative)	(1,330,000)	52,209	25,844	-	19,312	6,532	5,024
Development Level C							
. Harbourfront Ph.II	48,845	1,915	948	60	569	379	292
. CP Railway Lands	514,480	20,176	9,987	75	7,490	2,497	1,921
TOTALS (Cumulative)	(1,895,000)	74,300	36,779	-	27,371	9,408	7,237
Development Level D							
. CN Railway Lands	514,480	20,176	9,987	60	5,992	3,995	3,073
TOTALS (Cumulative)	(2,410,000)	94,476	46,766	-	33,363	13,403	10,310

NOTES:
1. 25.5 sq. m/employee.
2. 10% vacancy/absenteeism, 55% peak hour factor.
3. While a proposal has been submitted to the City of Toronto recently to transfer approximately 49,000 sq. m of commercial space from Harbour Square to the proposed Scotia Plaza site at King and Bay, this has not yet been approved and therefore is not reflected in these figures.
4. Excludes parcels where redevelopment could take place.
5. Numbers in brackets are rounded.



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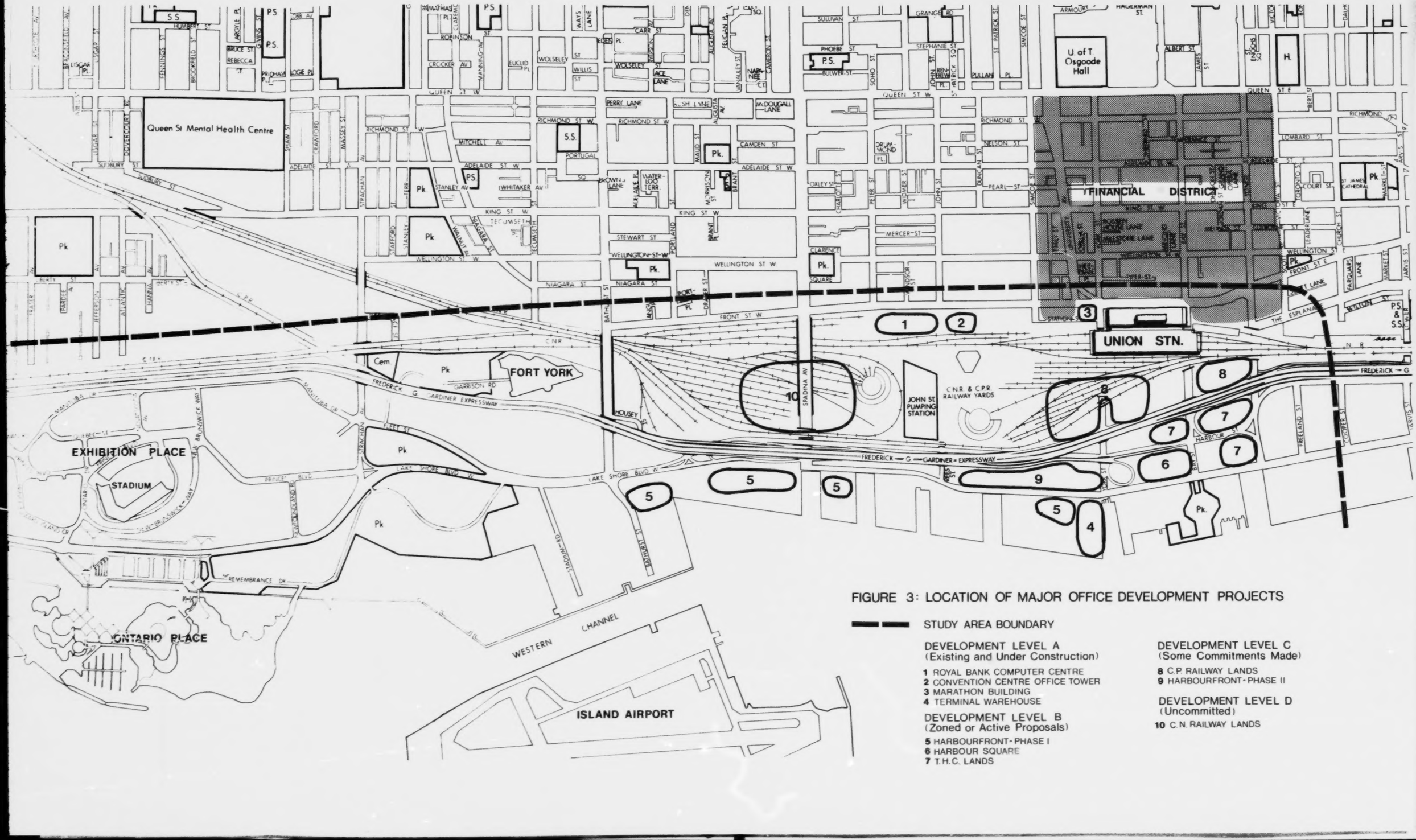


FIGURE 3: LOCATION OF MAJOR OFFICE DEVELOPMENT PROJECTS

STUDY AREA BOUNDARY

DEVELOPMENT LEVEL A
(Existing and Under Construction)

1 ROYAL BANK COMPUTER CENTRE
2 CONVENTION CENTRE OFFICE TOWER
3 MARATHON BUILDING
4 TERMINAL WAREHOUSE

DEVELOPMENT LEVEL B
(Zoned or Active Proposals)

5 HARBOURFRONT - PHASE I
6 HARBOUR SQUARE
7 T.H.C. LANDS

DEVELOPMENT LEVEL C
(Some Commitments Made)

8 C.P. RAILWAY LANDS
9 HARBOURFRONT - PHASE II

DEVELOPMENT LEVEL D
(Uncommitted)

10 C.N. RAILWAY LANDS

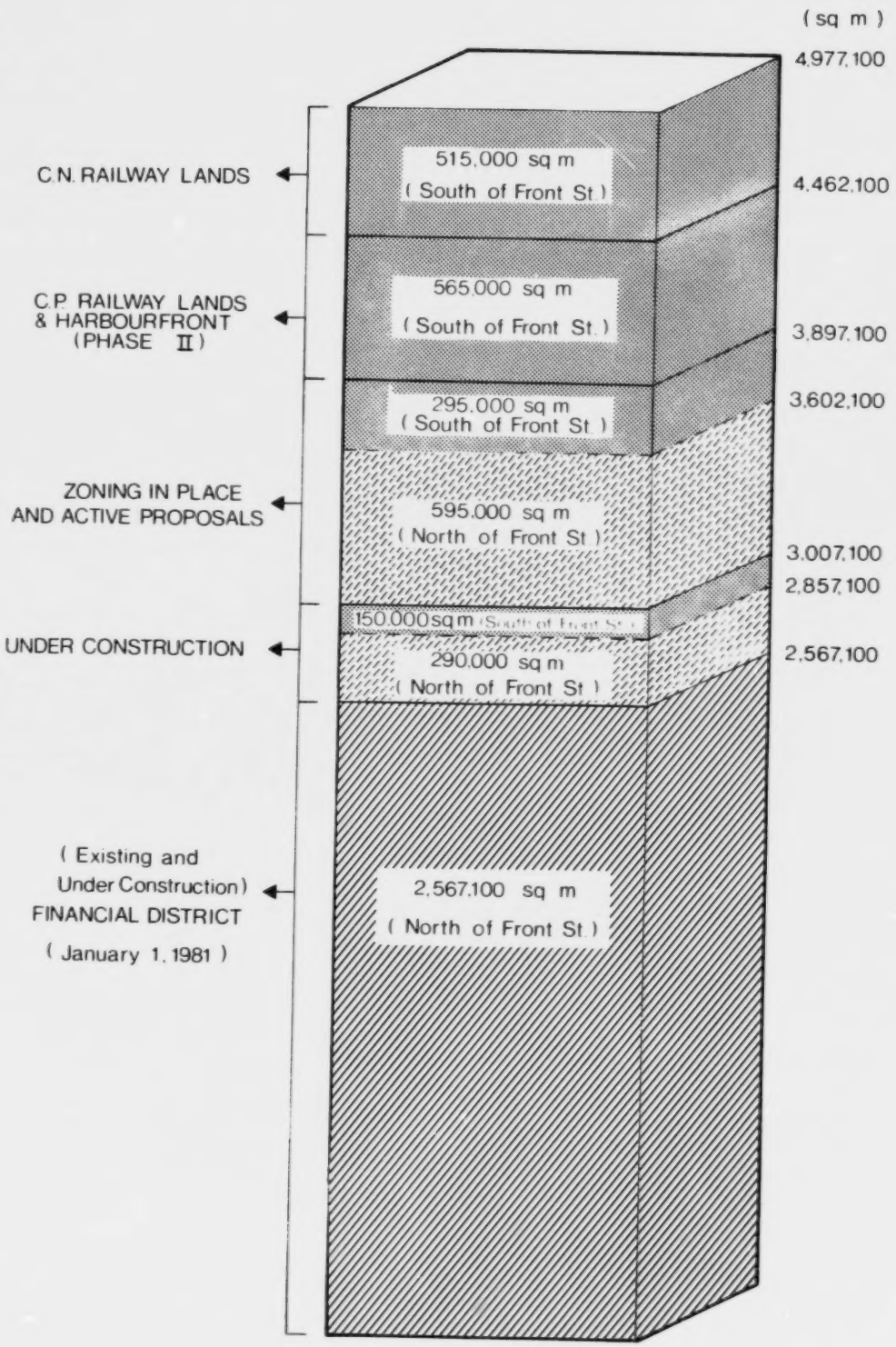


FIGURE 4 :
EXISTING AND POTENTIAL OFFICE SPACE
IN THE FINANCIAL DISTRICT AND CENTRAL WATERFRONT

(6) Future Travel Demand

(a) Estimated Additional Employment

In order to translate the amount of proposed office development into potential office employment, an average FSW ratio is applied. Based on the trends of FSW ratios observed for the Central Core Area office buildings during the past years, it is believed that it would be realistic to assume an average value of 25.5 sq. m/employee (275 sq. ft/employee) for the proposed office development in the Central Waterfront area. Therefore, the proposed office development listed in Table 2 would accommodate a total of almost 60,000 new employees (south of Front Street only). If an average office vacancy rate/absenteeism factor of 10% is assumed, the estimated additional employment in the area, on any given day, would be about 54,000.

(b) Estimated Additional Peak Hour Trips

Based on previous surveys conducted for the Central Area it was estimated that about 55% of office employees make their work trips during peak hours. Therefore, using an average peak hour factor of 0.55 it is estimated that the new office development in the Central Waterfront area will generate an additional 29,000 peak hour person trips.

(c) Modal Split Assumptions

The following modal split assumptions have been used for the travel demand analysis :

- 80% transit usage from the Marathon Building and developments north of Front Street;
- 75% transit usage from developments in the CP Railway Lands;

- 65% transit usage from Convention Centre, Harbour Square and Central Bayfront office developments;
- 60% transit usage from those developments with frequent surface transit service, i.e., Harbourfront, CN lands and the Royal Bank Computer Centre.

These assumptions are consistent with the expected transit usage assumptions made during the Railway Lands Access Study - Phase II, for work trips generated by the various assumed office developments.

(d) Auto Trip Distribution Assumptions

Distribution of work trips generated by the potential office development in the Central Waterfront area is expected to be 1/3 north into the City and to the inner sections of the north-east and the north-west; the remaining 2/3 to the south to reach the Gardiner Expressway/Lake Shore Boulevard corridor and then east or west, more or less half and half. Figure 5 shows schematically the distribution pattern assumed for the auto trips to be assigned to the existing road network.

(e) Auto Trip Assignments

Based on the trip generation, distribution and modal split assumptions reviewed in the previous paragraphs, the estimated additional auto vehicle trips generated by various office development areas have been assigned to the existing road network. An average auto occupancy factor of 1.3 has been used to convert the person trips to vehicle trips. Development traffic volumes have then been estimated for the four levels of development previously defined.

(f) Road Capacity Analysis and Identified Deficiencies

In order to estimate the possible impacts of development traffic on

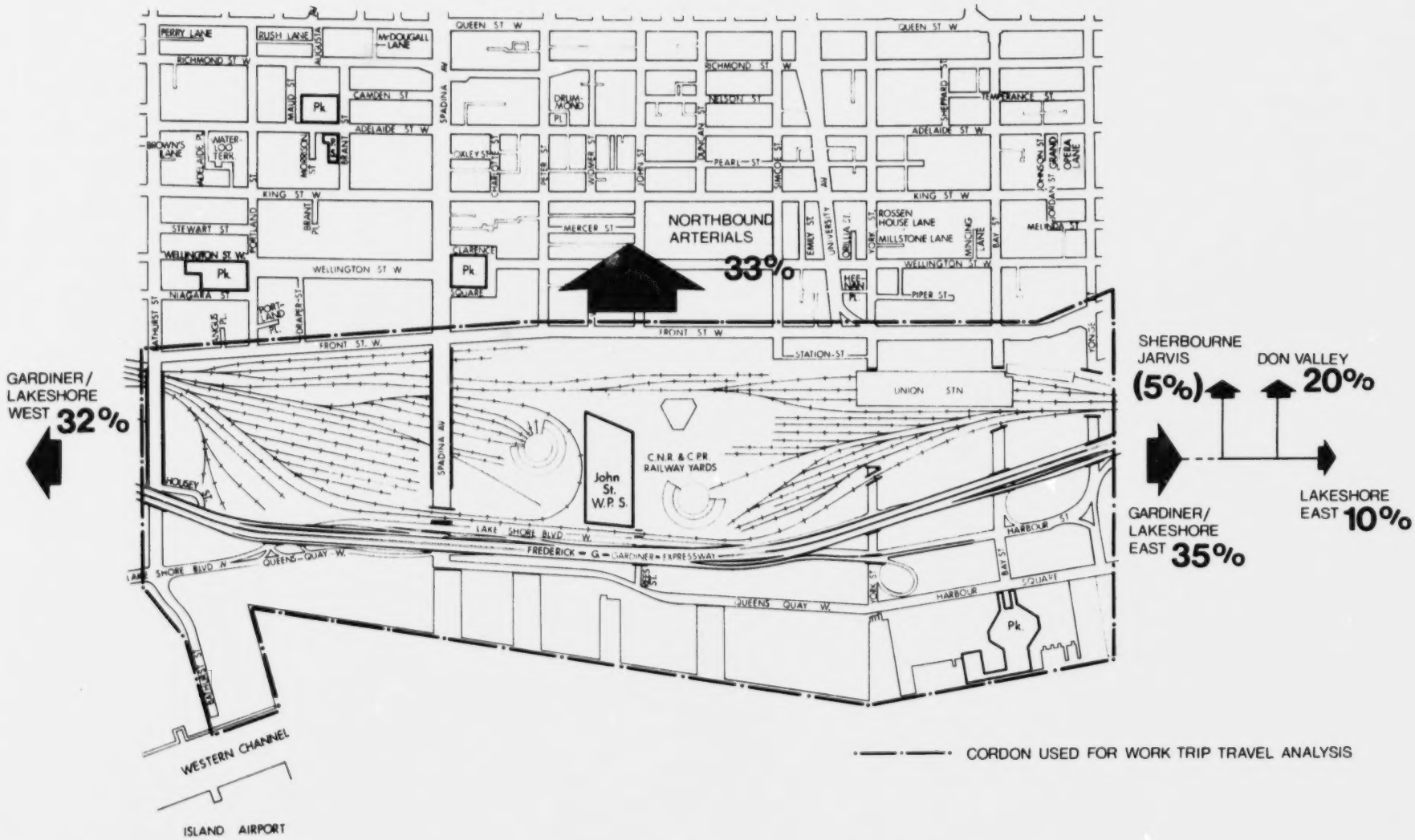


FIGURE 5 :
AUTO TRIP DISTRIBUTION PATTERN
P.M. PEAK PERIOD

the existing road network, estimated p.m. peak hour site-generated traffic volumes for each level of proposed development have been added to the existing traffic volumes. The combined volumes then have been compared with the estimated capacities of the roads serving the Central Waterfront area, across the cordon line shown in Figure 5.

Existing p.m. peak hour flows have been obtained from 1979 counts taken during Phase I of the Railway Lands Access Study supplemented by 1981 Metro cordon counts and automatic counts taken by the Metro Roads and Traffic Department. Capacity figures used in the analysis have been estimated, based on the figures from the Railway Lands Access Study-Phase I report and the Central Area Traffic Management Study - Key Numbers Book.

Figure 6 illustrates the V/C ratios estimated for the main directions during p.m. peak hours for the four levels of development. As can be seen from the figure, westbound is the most critical direction. It is estimated that the Gardiner/Lake Shore corridor westbound, west of Bathurst during the p.m. peak hour is already operating at capacity; therefore any additional development in the area would require the provision of extra capacity. There would be need for an additional expressway lane of capacity in each direction along this corridor, in order to accommodate the extra traffic generated by the office developments which are either under construction, have zoning in place or active proposals at this stage. Development of the Railway Lands would generate further additional traffic along the Gardiner/Lake Shore corridor west of Bathurst Street and it is estimated that one additional expressway lane in each direction would be required along this corridor if the entire proposed development is permitted. With just the CP part of the development, one additional arterial lane of capacity in the corridor north of the development area would be sufficient to accommodate the additional development traffic along this corridor. However, at the ultimate development

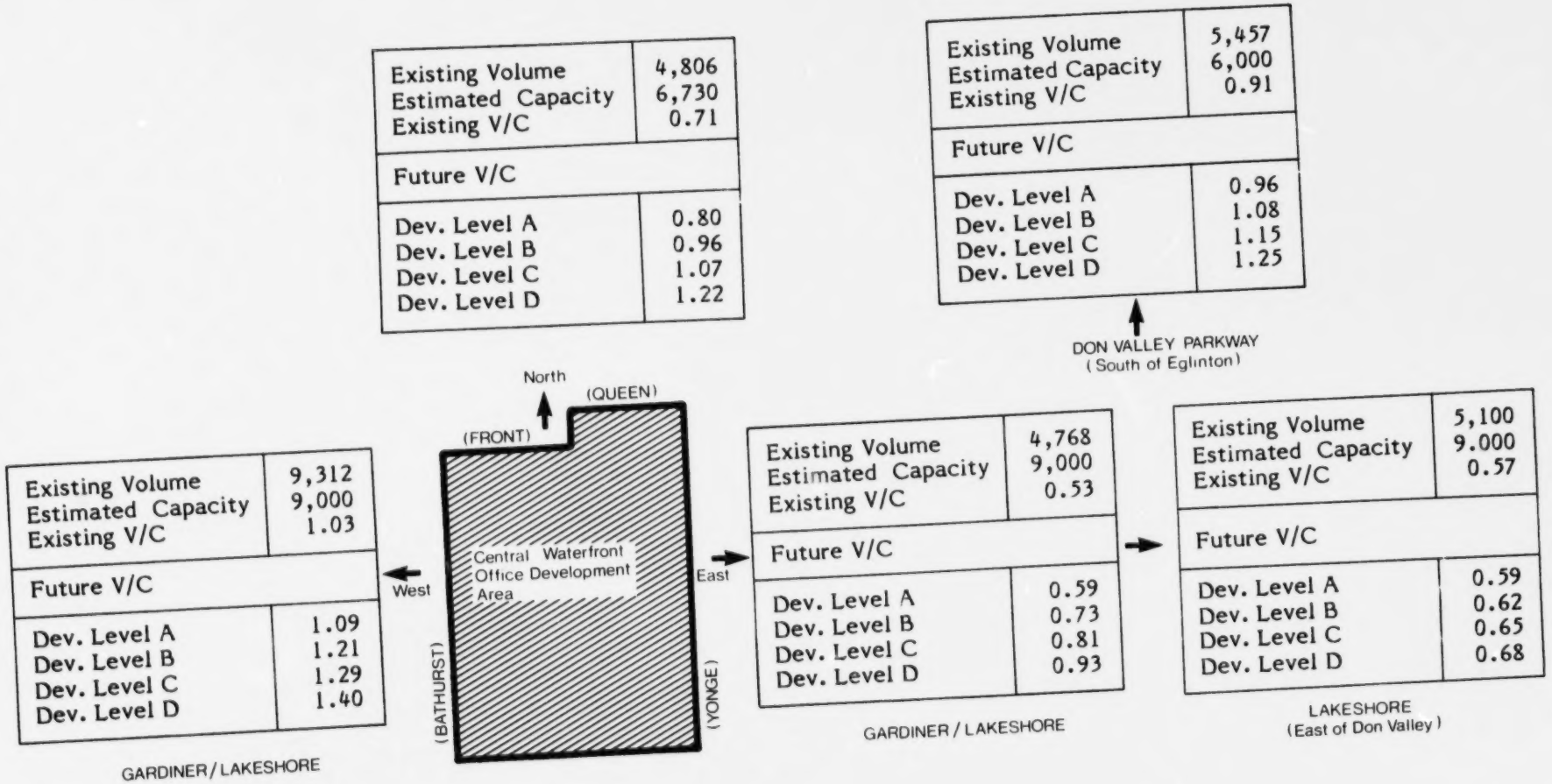


FIGURE 6:
ESTIMATED VOLUME /CAPACITY RATIOS
FOR AUTO TRIPS (P.M. PEAK HOUR)

stage (with CN development included), a further two arterial lanes would be required in the north corridor. The Gardiner/Lake Shore corridor just east of Bay Street would not have a critical capacity problem due to the potential development in the Central Waterfront area. However, part of the additional traffic generated along this corridor would go north to the Don Valley Parkway and it is estimated that this additional traffic on the Parkway would necessitate improvements in the Don Valley corridor south of Eglinton Avenue.

(g) Transit Trip Distribution Assumptions

The distribution of peak hour transit trips generated by the Central Area is based on origin/destination information collected during the Central Area Parking and Loading Survey carried out by the City of Toronto Public Works Department.

The observed orientation of p.m. peak hour TTC and GO transit trips generated in the Central Area is summarized in Table 3. The detailed distribution pattern of subway trips at the transfer stations has been obtained from the "T.T.C. Subway System Origin - Destination Survey" conducted in October, 1978.

Figure 7 shows schematically the transit trip distribution pattern assumed for the demand analysis.

(h) Transit Trip Assignments

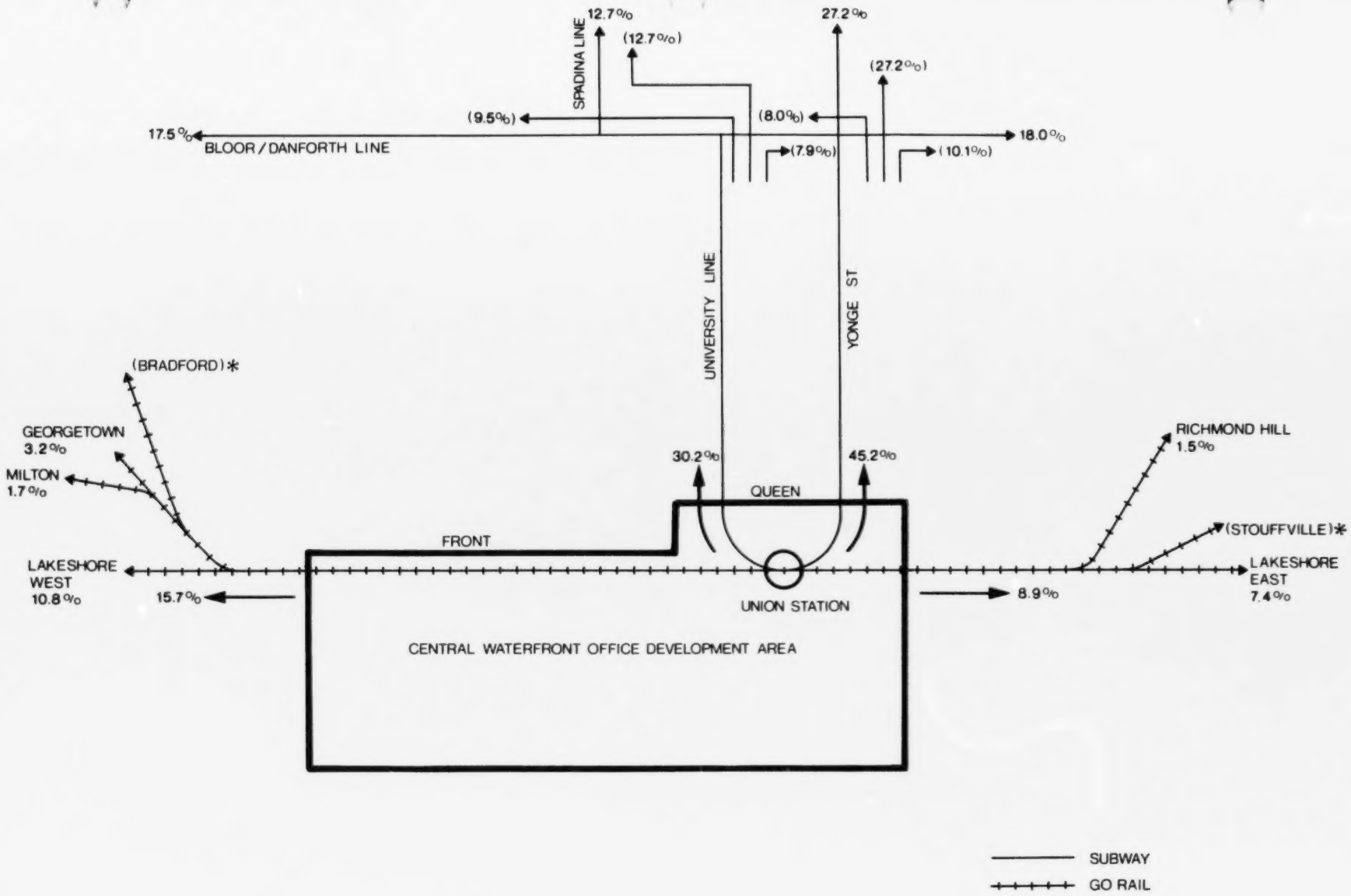
The estimated additional transit person trips generated by the various proposed office developments have been assigned to the existing rapid transit network based on the distribution pattern assumed in the previous paragraph. Similar to the auto trips, the assignment of transit trips has also been made separately for the four development levels assumed for this study, and separately for TTC and GO Rail trips.

TABLE 3

DISTRIBUTION OF T.T.C. AND GO TRANSIT TRIPS GENERATED BY CENTRAL AREA DEVELOPMENT

Direction	Percentages[1]	
	T.T.C.	GO Rail
Metro West	11.1	0.3
Mississauga	7.4	15.1
West Total	18.5	15.4
Metro North	24.5	1.1
York Region	4.5	2.2
North Total	29.0	3.3
Metro East	17.3	2.8
Durham Region	1.4	3.1
East Total	18.7	5.9
Central Area	9.2	
Totals	75.4	24.6

1. Percentages based on results of the 1975 Central Area Parking and Loading Survey.



*NEW GO TRANSIT LINE
NO RIDERSHIP DATA AVAILABLE

FIGURE 7 :
TRANSIT TRIP DISTRIBUTION PATTERN
P.M. PEAK PERIOD

(i) Transit Capacity Analysis and Identified Deficiencies

In order to estimate the possible impacts of the additional transit trips generated by the new development on the existing rapid transit system, the generated p.m. peak hour trips for each development level have been added to the present ridership on the transit network. The total ridership estimates so obtained then have been compared with the estimated capacities of the subway and the GO Rail system at various critical locations outside the development area.

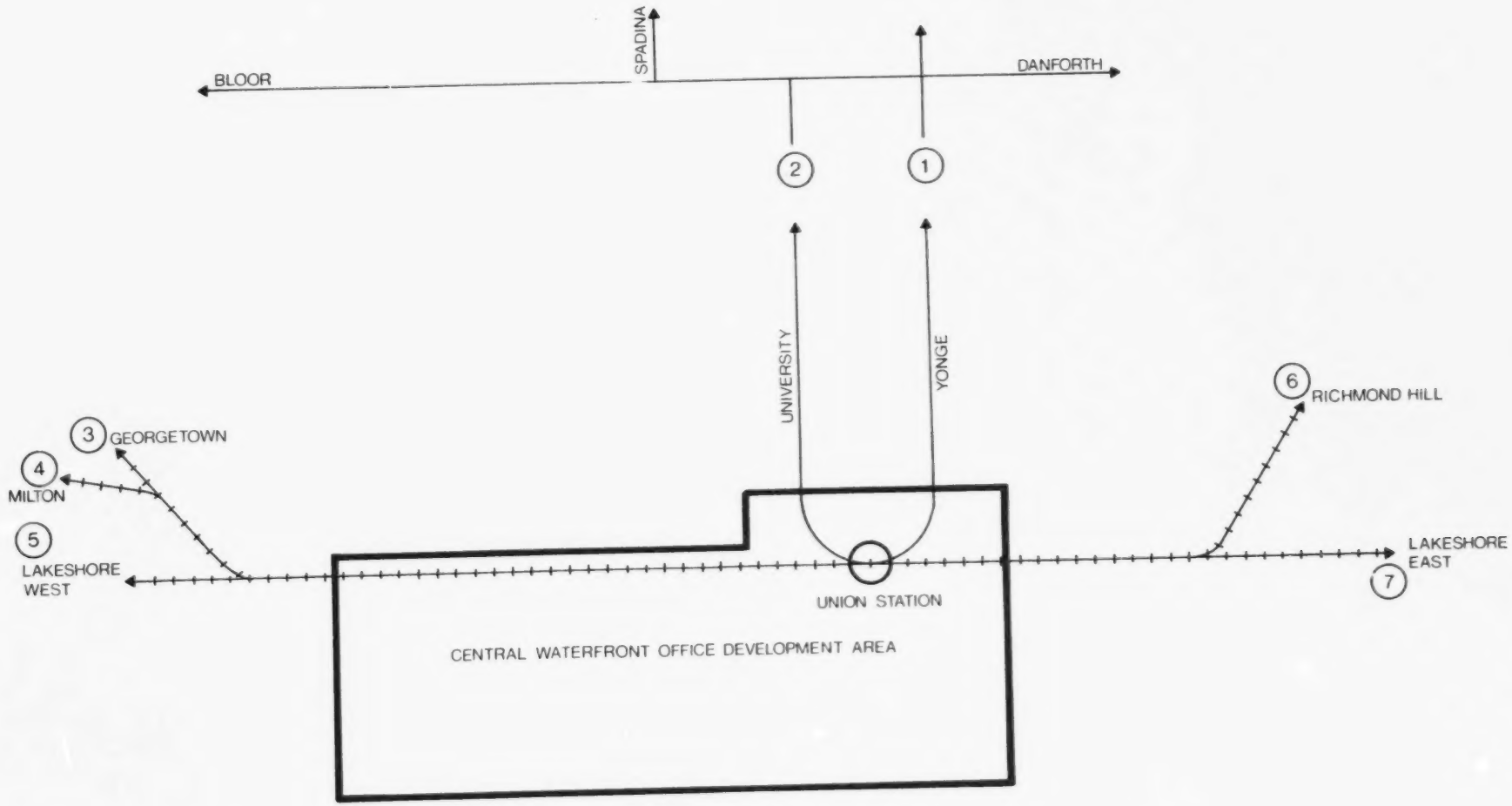
Estimated Ridership/Capacity ratios during the p.m. peak hours, for the three stages of development are illustrated in Figure 8. As can be seen from this figure, the most critical capacity deficiency occurs on the Yonge subway line south of Bloor Street for all development levels studied.

As previously noted, existing surface transit services are designed primarily to serve demands outside the study area. As development proceeds, new and increased services will be required to improve the transit modal split and to allow full development of Harbourfront and the Central Bayfront area.

The transit demand analysis has also indicated that a serious capacity deficiency would occur along the Lake Shore West GO Rail line, particularly if the CN Railway Lands development is permitted.

(j) Travel Demand Analysis for the Exhibition Place Area

In addition to the proposed office/commercial development in the Central Waterfront area, there are plans for the redevelopment of Exhibition Place. A feasibility study of a world class international trade centre and covered stadium complex is currently underway by Currie


SPADINA
BLOOR
DANFORTH
2
1
UNIVERSITY
YONGE
6
RICHMOND HILL
3
GEORGETOWN
4
MILTON
5
LAKESHORE
WEST
LAKESHORE
EAST
7
UNION STATION
CENTRAL WATERFRONT OFFICE DEVELOPMENT AREA

Existing Ridership	35,216
Estimated Capacity	37,800
Existing R/C	0.93
Future R/C	
Dev. Level A	1.01
Dev. Level B	1.15
Dev. Level C	1.25
Dev. Level D	1.32

(1)

Existing Ridership	23,938
Estimated Capacity	37,800
Existing R/C	0.63
Future R/C	
Dev. Level A	0.69
Dev. Level B	0.81
Dev. Level C	0.86
Dev. Level D	0.91

(2)

Existing Ridership	1,976
Estimated Capacity	6,480
Existing R/C	0.30
Future R/C	
Dev. Level A	0.34
Dev. Level B	0.40
Dev. Level C	0.44
Dev. Level D	0.47

(3)

Existing Ridership	1,076
Estimated Capacity	4,320
Existing R/C	0.25
Future R/C	
Dev. Level A	0.27
Dev. Level B	0.33
Dev. Level C	0.36
Dev. Level D	0.38

(4)

Existing Ridership	6,533
Estimated Capacity	8,640
Existing R/C	0.76
Future R/C	
Dev. Level A	0.84
Dev. Level B	1.00
Dev. Level C	1.10
Dev. Level D	1.17

(5)

Existing Ridership	843
Estimated Capacity	4,320
Existing R/C	0.20
Future R/C	
Dev. Level A	0.22
Dev. Level B	0.26
Dev. Level C	0.29
Dev. Level D	0.31

(6)

Existing Ridership	4,310
Estimated Capacity	6,480
Existing R/C	0.67
Future R/C	
Dev. Level A	0.74
Dev. Level B	0.89
Dev. Level C	0.98
Dev. Level D	1.05

(7)

FIGURE 8:
ESTIMATED RIDERSHIP/CAPACITY RATIOS
FOR TRANSIT TRIPS (P.M. PEAK HOUR)

Coopers and Lybrand. Based on a preliminary travel demand analysis, it is estimated that future peak hour departure rates from the Exhibition Place area could be as high as 55,000 - 65,000 person trips per hour; and such 'worst case conditions' are likely to occur at times when major events are scheduled for the same time at the proposed expanded stadium, the proposed international trade centre, and/or other Exhibition Place and Ontario Place facilities. More detailed analysis will be undertaken as part of the Currie,Coopers and Lybrand study.

According to the latest proposals, the total number of parking spaces available within Exhibition Place and Ontario Place is likely to remain at about 8000. However, full utilization of parking lots may not be possible due to different arrival times and lengths of stay by visitors to the various activities. For example, during the arrival of visitors to a major sporting event, most of the parking lots could already be partly occupied by visitors to other shows who have arrived earlier and do not necessarily have to leave during the same departure hour as the sports fans. Therefore, the total number of vehicles leaving the parking lots during the peak departure hour would be substantially less than the total available parking capacity. Also, the rate of exiting flow from the parking lots within Exhibition Place would be controlled by the capacities of the adjacent road system and the exit locations from Exhibition Place. Based on traffic surveys conducted during the past few years and considering that some operational improvements can be made to the traffic conditions in the area, it is estimated that about 4,000 vehicles would be discharged from the Exhibition Place parking lots and an additional 1,000 vehicles from the Ontario Place parking lots, during a peak departure hour. These estimates are consistent with the total capacity of exit locations from Exhibition Place and Ontario Place. Therefore, the maximum departure rate for autos leaving Exhibition Place and Ontario Place during a peak departure hour is assumed to be 5,000 vehicles per hour.

Given the possible future capacities of GO train and T.T.C. surface transit services and assuming that approximately 5000 exiting visitors would be travelling by 'other' modes such as walking, cycling, and taxi, additional transit capacity of 13,500 to 19,500 passengers per hour is required to service Exhibition Place and Ontario Place.

A comparison of estimated demand versus capacities is presented for design hour departure rates of 55,000 and 65,000 person trips in Table 4.

(7) Transportation Improvement Options

(a) Road Improvement Options

The Railway Lands Access Study - Phase II report has recommended specific improvements to the road system in the vicinity of the development area in order to provide better access opportunities to the Railway Lands. Future capacity deficiencies for the major road system beyond the Central Waterfront study area have been identified and summarized in Section (6). Furthermore, the planned redevelopment at Exhibition Place would also require road improvements in the area.

Based on the existing traffic conditions and the traffic impact analysis carried out for the expected future development, the following road improvement options have been assessed:

(i) Front Street Extension and its connection to the Gardiner Expressway

The Front Street extension west of Bathurst Street as a 4-lane roadway to the Gardiner Expressway would provide an additional access route into the downtown area and reduce the overloading on the Bay, York and Spadina connections to the Gardiner Expressway. The further extension of Front Street to Strachan

TABLE 4

COMPARISON OF TRAVEL DEMAND VERSUS CAPACITIES FOR THE EXHIBITION PLACE AREA

Design Hour Departure Rate (Person trips)	55,000	65,000
No. of persons leaving by auto (5000 vehicles x 2.5 persons/car)	12,500	12,500
Other miscellaneous modes (walking, cycling, taxi, etc.)	5,000	5,000
Required no. of person trips by transit	37,500	47,500
Required transit modal split	(68%)	(73%)
Possible Transit Capacities:		
(a) GO trains		
. from the East	5,000	5,000
. from the West	5,000	5,000
(b) T.T.C. Services		
. Dufferin Bus	4,000	5,000
. Bathurst Streetcar	4,000	5,000
. Express, charter and special services	6,000	8,000
TOTALS	24,000	28,000
Additional Transit Capacity Required (persons per hour)	13,500	19,500

Avenue including ramp extensions to Manitoba Drive would provide better access to Exhibition Place from the downtown core for road and transit. The cost of this project is estimated to be $55 million (1983 dollars).

(ii) Widening of the Gardiner Expressway between the proposed Front Street Extension and the Humber River

As mentioned in the previous section, the Gardiner/Lake Shore Corridor west of Bathurst street is now operating at capacity. The widening of the expressway from 3 to 4 lanes in each direction between the proposed Front Street interchange and the Humber River would eliminate the bottleneck at this section by providing an additional capacity of 2,000 v.p.h. in each direction. This would reduce the existing congestion, and accommodate some additional traffic generated by new development. This project is estimated to cost about $35 million (1983 dollars).

(iii) Dufferin Street Extension and Jog Elimination

Other road improvements which are required at the lower levels of the Central Waterfront area development and the redevelopment of Exhibition Place are the southerly extension of Dufferin Street to connect to Lake Shore Boulevard and the elimination of the jog along Dufferin Street at Queen Street. These improvements are necessary in order to develop continuity along Dufferin Street since there is no north-south arterial connecting to the Lake Shore Corridor between Bathurst Street and Parkside Drive. The estimated cost for the Dufferin Street extension and jog elimination is $11 million (1983 dollars).

(iv) Widening of Spadina Bridge and Redesign of Spadina Avenue north of Front Street

In order to provide the required access capacity especially to the Railway Lands and the Harbourfront developments, the widening and reconstruction of the Spadina bridge south of Front Street is essential to provide 6 traffic lanes plus the necessary exclusive right-of-way for a Spadina L.R.T. facility. The estimated cost of this project is $5 million[1]. Between Front Street and Bloor Street the right-of-way of Spadina Avenue is very wide (40 m). Redesign of this section is required to accommodate an exclusive transit right-of-way for an L.R.T. line and to increase road capacity by replacing the existing angle parking with parallel parking, thereby reducing side friction. The reconstruction of Spadina Avenue would cost about $4 million (1983 dollars).

(v) Widening of Bayview Extension and Improved Connections to Eastern Avenue and Front Street

The traffic impact analysis in Section (6) has indicated that additional capacity will be required in the Don Valley corridor due to the proposed development. In order to partly relieve the possible congestion in the north-east corridor it is proposed that the Bayview Extension be widened south of River Street and its connections to Eastern Avenue and Front Street be improved. This project would cost $4 million (1983 dollars).

(vi) Widenings of York Street and Bathurst Street, south of Front Street

With the possible development of the Railway Lands and continued growth in the Central Area, additional access capacity

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1. "Railway Lands Access Study - Phase II", Read, Voorhees and Associates, October 1981.

in the north-south direction will be required. Therefore, to accommodate this level of development, the widenings of York and Bathurst Streets south of Front Street should be considered as possible improvements. The widening of York Street will require that the right-of-way be increased from 20m to 30m.

(vii) Widening and Relocation of the Gardiner Expressway between Bathurst and Jarvis Streets

The option of widening and relocation (possible depressing) of the Gardiner Expressway between the proposed Front Street interchange and Jarvis Street should also be considered before the full scale development of the Central Waterfront area is approved.

(viii) Simcoe Street Extension

In order to increase the access capacity into the Railway Lands, the extension of Simcoe Street from the north under the railway corridor south to Lake Shore Boulevard is proposed. This extension would also provide additional roadway capacity to downtown from the Gardiner/Lake Shore corridor. This access capacity would be required in order to off-set the reductions in the available capacities of York and Bay Streets for downtown destined trips due to the trips generated by CP Railway Lands, Harbourfront and Central Bayfront developments. Such an extension of Simcoe Street would create a new intersection along Lake Shore Boulevard, about midway between York and John Streets. The cost of the railway underpass has been estimated at $12 million (1983 dollars) and it is expected that developers of the railway lands would contribute to this cost.

(ix) Widening of Don Valley Parkway south of Eglinton Avenue

The impact of Development Level D on the Don Valley Parkway would be such that widening of the Parkway, south of Eglinton Avenue, from 3 to 4 lanes in each direction, would be necessary. Alternatively, the extension of the Gardiner Expressway into Scarborough or the extension of Leslie Street south of Eglinton Avenue would divert some of the traffic from the Don Valley Parkway leaving spare capacity for the additional traffic generated by new downtown and Central Waterfront development.

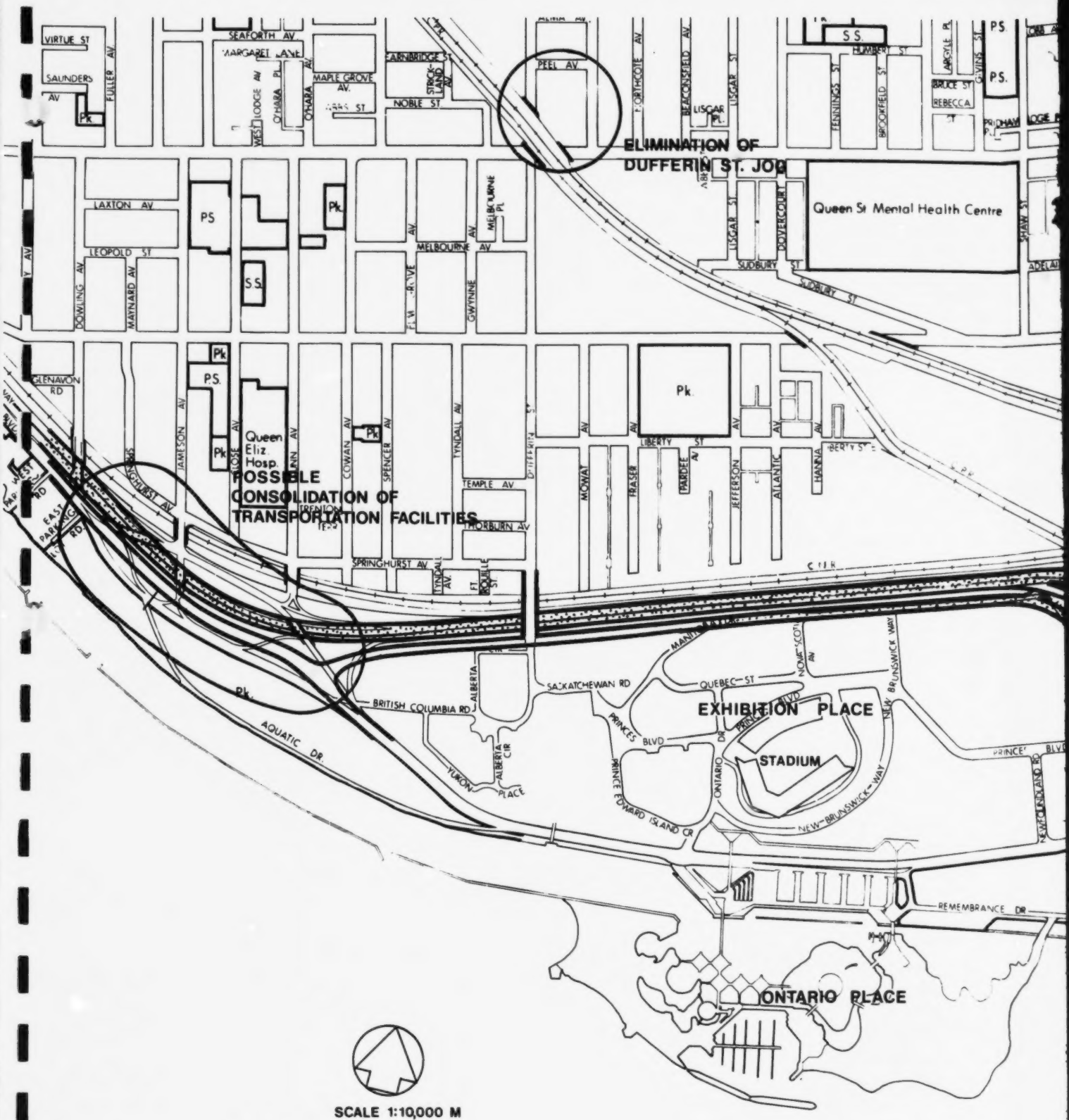
(x) Extension of W. R. Allen Road and Black Creek Drive

Also, in the long term, it would be desirable to provide additional road capacity from the Central Area to Hwy. 401, through the north-west corridor. This would be possible by either extending the W.R. Allen Road southerly from Eglinton Avenue to Bloor Street or extending Black Creek Drive from Weston Road south to connect to Richmond/Adelaide Streets.

In addition to the road improvement options mentioned above, Bathurst Street and Jarvis Street should be upgraded as much as possible by undertaking intersection improvements and minor widenings at key locations. Intersection improvements at York Street/Queen's Quay and Bathurst Street/Lake Shore Boulevard should also be undertaken. The various road improvement options are shown schematically in Figure 9.

(b) Transit Improvement Options

From the transit trip demand analysis, it has become apparent that new and improved transit service will be needed in the Central Waterfront area not only to carry most of the new office work trips



METROPOLITAN TORONTO PLANNING DEPARTMENT
TRANSPORTATION DIVISION MAY 1983

ELIMINATION OF DUFFERIN ST. JOG

Queen St Mental Health Centre

EXHIBITION PLACE

STADIUM

ONTARIO PLACE

FORT YORK

UNION STN.

U. of T. Osgoode Hall

ISLAND AIRPORT

WESTERN CHANNEL

FIGURE 9: ROAD IMPROVEMENT OPTIONS

NEW ROADS

ROAD WIDENINGS

ROAD REDESIGN

INTERSECTION IMPROVEMENTS

generated in the area, but also to provide better access to a redeveloped Exhibition Place/Ontario Place area and to an expanded stadium. Therefore, the following transit improvement options have been assessed.

(i) Yonge Subway 'Relief' Proposals

The transit trip demand analysis has indicated that the practical capacity on the Yonge subway south of Bloor Street will be exceeded in the near future. In order to relieve the capacity problem on the Yonge subway line and at the Bloor/Yonge transfer station in the next few years, TTC staff have recommended the addition of two trains to the Yonge/University/Spadina service and the implementation of a new Sherbourne express bus service from Castle Frank station to downtown.

To eliminate the intermediate and long term capacity deficiency a rapid transit 'relief' line linking Union Station to the Danforth subway has been proposed in the recently completed Metro/T.T.C. Rapid Transit Study. Since a significant portion of the new office developments in the Central Waterfront area will be within walking distance of Union Station, the 'relief' line would be utilized by a large number of new trips generated in the development area. For Development Level D, estimated peak hour riderships of approximately 6,500 and 2,850 passengers are forecast to divert from the Yonge and University subway lines respectively to the 'relief' line. The cost of the 'relief' line (exclusive of land costs) is estimated at $272 million (1983 dollars).

(ii) Waterfront I.C.T.S Line

A Waterfront I.C.T.S. line from Union Station to the Exhibition

Place area could be considered as an extension to the 'relief' line as suggested in the Metro/TTC Rapid Transit Study. The preferred alignment for such a facility would be integrated with development in the Railway Lands, possibly following a median alignment along the proposed 'spine' road through the C.N. part of the Railway Lands.

Such a rapid transit facility would provide access to the CN part of the Railway Lands and prevent further congestion at Union Station by eliminating transfers from the 'relief' line. It would also provide much better service and increase transit capacity to Exhibition Place. The estimated cost of a Waterfront I.C.T.S. line from Union Station to Exhibtion Place including a temporary maintenance yard (exclusive of land costs) is $187 million (1983 dollars).The preferred alignment for a Waterfront I.C.T.S and other transit improvement options are shown in Figure 10.

(iii) Harbourfront Light Rail Transit (L.R.T.)

The major proportion of office development in the Central Waterfront area will be concentrated south of Union Station on Bay Street, York Street, and Queen's Quay. Since most transit passengers into this area will be feeding into Union Station, there will be a need for a moderately high capacity L.R.T. facility to distribute trips to the south.

Such a facility could run from Union Station southerly on Bay or York Streets and then westerly along Queen's Quay to Spadina Avenue. With regard to the alignment of the L.R.T. service along Queen's Quay, various options have been considered. The L.R.T. service could run along the Queen's Quay road right-of-way or alternatively follow an exclusive transit corridor north of Queen's Quay through Harbourfront. This exclusive corridor was identified

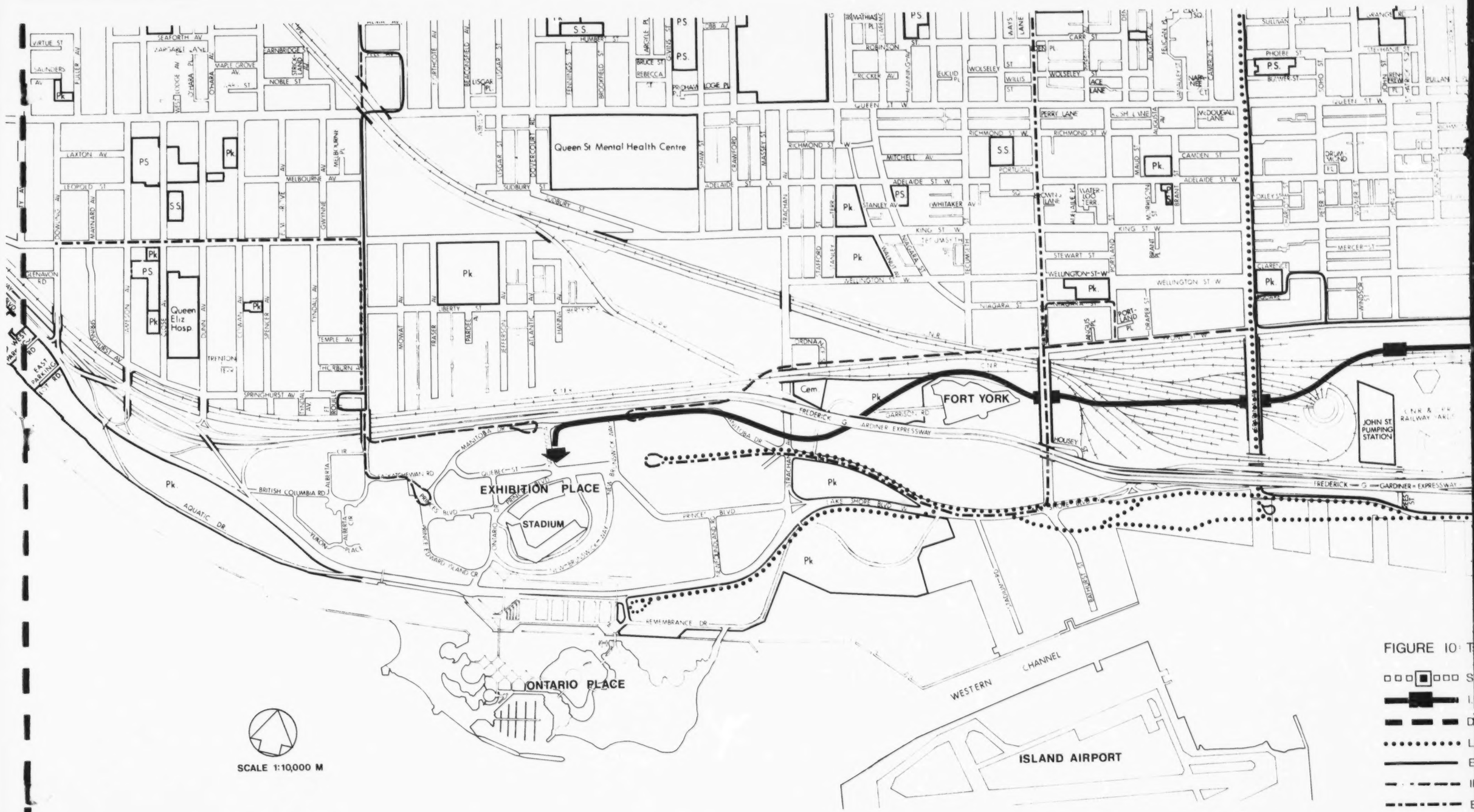


FIGURE 10: T

METROPOLITAN TORONTO PLANNING DEPARTMENT
TRANSPORTATION DIVISION MAY 1983

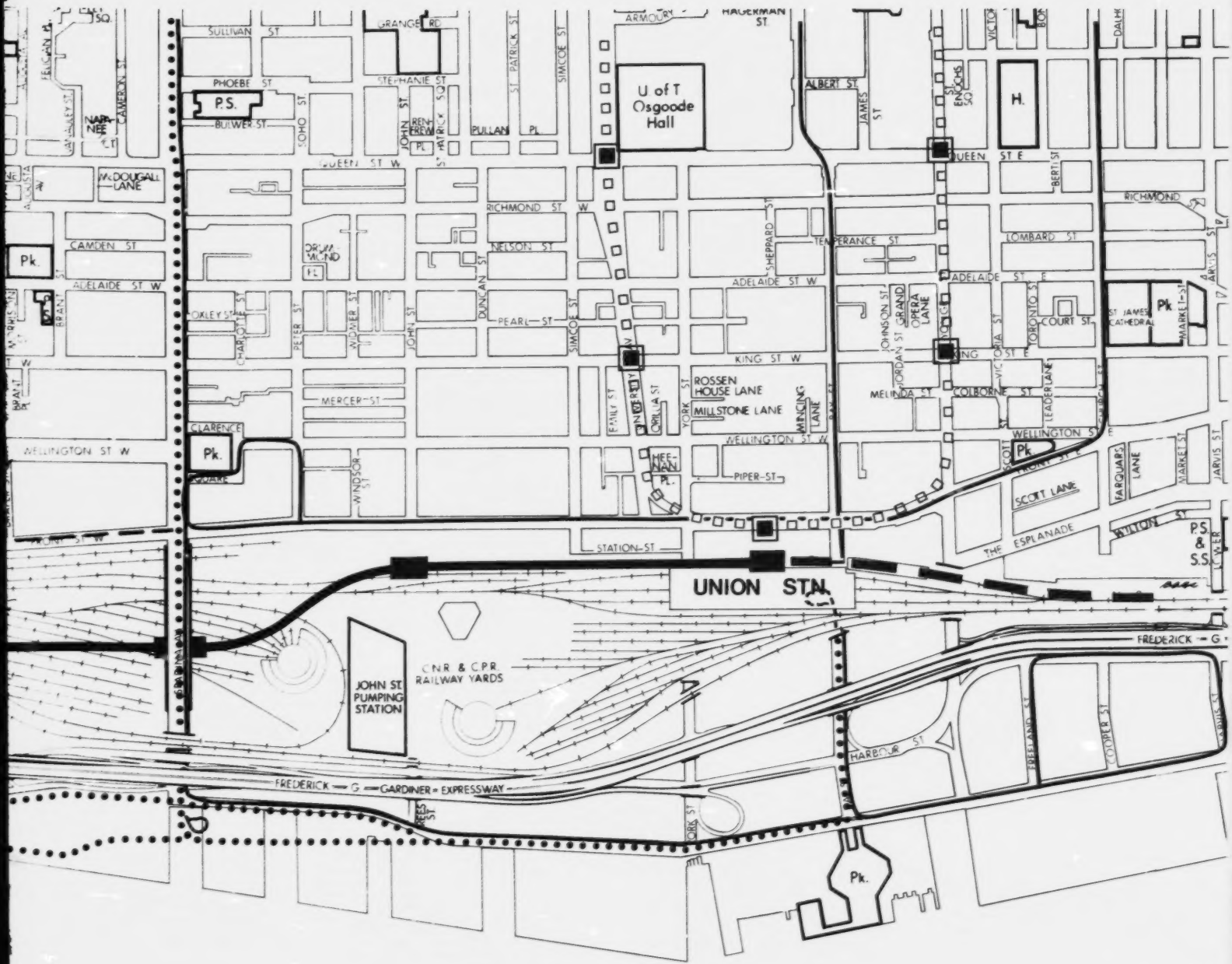


FIGURE 10: TRANSIT IMPROVEMENT OPTIONS

- SUBWAY (EXISTING)
- I.C.T.S. LINE
- DOWNTOWN 'RELIEF LINE'
- L.R.T. LINE OPTIONS
- EXISTING BUS ROUTES
- IMPROVEMENTS TO BUS SERVICE
- EXISTING STREETCAR ROUTES

at the time the overall Harbourfront Plan was approved and is currently being protected. Combinations of the above alignments are also possible. After considering various options for this facility, it has been agreed that the preferred alignment would be from an underground loop at Union Station, southerly on Bay Street (via a protected median right-of-way) and westerly along the median of the Queen's Quay right-of-way (also protected) to a loop at the north-east corner of the re-aligned Queen's Quay and Spadina Avenue. The widening of Queen's Quay to 27 metres from York Street to Spadina Avenue and Bay Street to 30 metres from Front Street to Queen's Quay would be required for this option.

Since such a facility would serve the proposed office development in Harbourfront, as well as the Central Bayfront, provision of this L.R.T. line would allow Metropolitan Toronto to approve the portion of Harbourfront office development (49,000 sq.m) which has been deferred pending the resolution of transportation concerns.

A preliminary cost estimate of the Harbourfront project between Union Station and a Spadina/Queen's Quay loop is about $29 million (1983 dollars).

(iv) Transit Extension to Exhibition Place

A transit service from Union Station along Bay Street and Queen's Quay to Spadina Avenue could be extended west of Spadina Avenue either along the new alignment of Queen's Quay or within the exclusive right-of-way on the south side of Lake Shore Boulevard. This line could either cross Lake Shore Boulevard in the vicinity of Bathurst Street by a grade separation and extend into Exhibition Place utilizing the existing streetcar tracks on Fleet Street (possibly with a Strachan Avenue underpass,) or follow Lake Shore Boulevard (south side) to Ontario Place or to

Exhibition Place by crossing Lake Shore Boulevard with a grade separation west of Strachan Avenue. In addition to providing a direct service to the Exhibition Place area, such a transit facility would serve the western part of Harbourfront which otherwise would be served by only the Bathurst streetcar.

While a specific facility is not recommended at this time, the Queen's Quay right-of-way from Spadina Avenue to Bathurst Street should be increased to 27 metres to protect the option of providing a high quality transit service. Within Bathurst Quay,a 10 metre right-of-way should be protected on the Harbourfront property along the west side of Bathurst Street and the south side of Lake Shore Boulevard.

The estimated cost of the Harbourfront L.R.T. extension west of Spadina Avenue would be about $35 million for either of the two options described above, including vehicles (1983 dollars).

(v) Spadina Light Rail Transit (L.R.T.) Line

Re-introduction of streetcar or LRT service on an exclusive right-of-way along Spadina Avenue between the Bloor subway and Queen's Quay has been suggested by various agencies and individuals. It is envisaged that the Spadina LRT would primarily be utilized by passengers destined to the CN part of the Railway Lands and, with a connection to the Harbourfront LRT at the Spadina/Queen's Quay loop, could provide additional access to Harbourfront and the Central Bayfront areas. The Spadina LRT could also divert up to 2,500 peak hour trips from the Yonge and University subways. The estimated cost of the Spadina LRT is $41 million (1983 dollars).

(vi) Extension of Transit Service on Dufferin Street into Exhibition Place

An off-street bus loop at Dufferin Station has been proposed which, combined with elimination of the jog in Dufferin Street at Queen Street would provide an improved Dufferin bus service to Exhibition Place. Widening of the Dufferin bridge crossing the Gardiner Expressway which would allow access to the site by Dufferin buses and provision of a terminal loop in Exhibition Place would provide improved access to major attractions.

The streetcar service provided from the Dundas Street West station, along Roncesvalles, King Street and Dufferin Street during the Canadian National Exhibition, could be enhanced by the extension of the tracks into Exhibition Place and provision of regular service. This extension could connect to the existing Bathurst Streetcar loop and would provide a higher capacity transit service to the Exhibition Place area from the western part of Metro. The cost of laying the additional track has been estimated at $3 million (1983 dollars).

(vii) Front Street Bus Service

Initially, it was anticipated that the proposed extension of Front Street to Strachan Avenue would provide good access for an express bus service to Exhibition Place for special events and for a regular service connection to Union Station. However, preliminary analysis indicates that provision of a fare-paid transfer area at Union Station is physically impractical. Without that integration, a Front Street bus does not appear attractive as a high capacity express service to Exhibition Place. However, for special events a bus service could utilize the Front Street extension as a new route into Exhibition Place particularly if direct ramps to Manitoba Drive were provided east of Strachan Avenue.

Nevertheless, with respect to the regular service along Front Street, extension of the existing Church bus route to Bathurst Street may provide a better service to the new developments on Front Street. This service, however, would be intended as a relatively low capacity service distributing trips from Union Station.

In addition to the above T.T.C. alternative transit improvements, the Provincial Government has recently announced, as part of its Inter-Regional Rapid Transit Strategy, its intention to pursue the opportunity to establish an exclusive GO Transit right-of-way in the Lake Shore Corridor from Oakville to Pickering to provide for potentially significant increases in transit usage in the corridor. This option should be considered long term due to its relative low priority and the length of time required to secure such an exclusive corridor.

(8) Evaluation of Transportation Improvement Options

Based on the results of the travel demand analysis and the alternative road and transit improvements reviewed in the previous sections of this report, the following assessment has been made:

(a) Road System

(i) Lake Shore West Corridor

Completion of the projects now under construction will create a road capacity deficiency in the Lake Shore West corridor. Since the section of the Gardiner Expressway between Bathurst Street and the Humber River is operating beyond its practical capacity now, and under normal operating conditions little excess capacity exists on Lake Shore Boulevard, more road capacity in this corridor will be required. It must also be recognized that with an operational problem on the expressway, Lake Shore Boulevard is the natural diversionary route and it becomes overloaded under

these circumstances. The capacity of the Bay, York and Spadina connections to the Gardiner Expressway is being exceeded under the existing traffic flow conditions thus creating a significant degree of congestion on the surface street system. With the additional traffic expected, it will be necessary to provide additional access capacity to and from the Expressway. The Front Street extension west of Bathurst Street and its connection to the Gardiner Expressway, and widening of the Gardiner from there to the Humber River would enable the current operational difficulties to be resolved and permit some additional development growth. These improvements should therefore proceed as soon as possible.

(ii) Northern Corridor

With respect to north/south roads both within the study area and to the north, several improvements will be required to accommodate future downtown and Central Waterfront growth.

In order to improve the continuity of Dufferin Street and provide a more direct access from the north to Exhibition Place and the proposed international trade centre complex, a southerly extension of Dufferin Street to connect Lake Shore Boulevard and elimination of the jog at the Dufferin/Queen intersection should proceed in the near future.

With the development of the Railway Lands, the widening and reconstruction of the Spadina bridge and the redesign and upgrading of Spadina Avenue between Front Street and Bloor Street will be required to provide additional road capacity. The improvements should also provide an exclusive right-of-way for an LRT service on Spadina Avenue south of Bloor Street as proposed later in this report. This scale of development in the Central Waterfront area would also require the widening of York Street

south of Front Street and the upgrading of Bathurst and Jarvis Streets.

(iii) Lake Shore East Corridor

Although there is not expected to be any critical capacity problem immediately to the east of the study area (in the Lake Shore corridor), a significant capacity deficiency is expected in the Don Valley corridor south of Eglinton Avenue due to the additional trips generated. Alternative improvements in this corridor are presently under investigation as part of the Don Valley Corridor Transportation Study being undertaken by consultants for the Metropolitan Corporation. Irrespective of recommendations forthcoming from that study, the widening of the Bayview Extension south of River Street to provide a reversible third lane and the provision of better connections to Eastern Avenue and Front Street would make the Bayview Extension a more attractive route. Depending on what improvements are made to alleviate deficiencies in the Don Valley corridor, there may be a requirement for improvements in the Lake Shore East corridor.

(iv) Internal Road Improvements

In addition to the road improvements discussed in the previous sections, a number of new and/or improved roads will also be required in conjunction with specific developments. Within the Harbourfront development, Queen's Quay is presently being realigned and extended westerly along the waterfront to Stadium Road as a four lane City of Toronto collector road with a 20 metre road allowance. The section between York Street and Bathurst Street requires widening to a 27 metre road allowance to provide for an exclusive transit right-of-way

For development of the Railway Lands to proceed, a number of new roads (under the jurisdiction of the City of Toronto) will be required, the most important of which include:

- an east-west 'spine' road from Bay Street westerly to Bathurst Street;

- the extension of Simcoe Street south of Front Street (under the rail corridor) to Queen's Quay with an at-grade intersection with Lake Shore Boulevard;

- a new section of John Street from the east-west 'spine' road south to Queen's Quay with an at-grade intersection with Lake Shore Boulevard; and

- the extension of Portland Street south of Front Street (over the rail corridor) to Queen's Quay with an at-grade intersection (right turns only) with Lake Shore Boulevard.

Finally, within Exhibition Place, the widening of Manitoba Drive and its extension westerly to Dufferin Street would provide a continuous collector facility around the north edge of the site. Direct ramps from Manitoba Drive to the proposed Front Street extension at Strachan Avenue should also be provided.

(b) Transit System

(i) Yonge Subway Relief

The most critical section of the transit system is the Yonge subway line south of Bloor Street. This section of line is now operating close to its capacity in peak hours (37,800 passengers per hour in one direction) and any additional development in the Central Area (including the Waterfront) would increase

congestion. Upon completion of those developments now under construction, the peak hour demand would be about 38,000 passengers per hour. This demand can be sustained by adding to the Yonge-University-Spadina peak period service one of the two additional trains recommended in a recent T.T.C. study.

With continued development in the downtown and in the Central Bayfront and Harbourfront areas, the peak hour demand on the Yonge subway south of Bloor Street will increase to approximately 43,600 passengers per hour. Before this ridership level is reached, the second additional train will be required which will bring the capacity to just over 40,000 passengers per hour. Since a significant proportion of passengers on the Yonge subway south of Bloor Street transfer to and from the Danforth subway in peak hours, implementation of the proposed Castle Frank/Sherbourne express bus would be required to divert riders from the Yonge line. This service, with full transit priority, could carry 5400 passengers per hour and therefore could reduce the demand on the Yonge subway line south of Bloor Street to 38,200 passengers per hour.

With the development of additional office space associated with the C.P. part of the Railway Lands and the remainder of Harbourfront, the peak hour demand on the Yonge subway south of Bloor Street would increase to approximately 47,200 passengers per hour. Further subway relief would, therefore, be required which could take the form of either additional surface transit improvements or a new rapid transit line from the Danforth subway to the downtown (e.g. the Donlands to Union Station 'relief' line proposed in the A.R.T.S. Study).

With the full development of the Railway Lands as proposed, an estimated additional demand of 2600 passengers per hour projected for the Yonge subway line south of Bloor Street would

result in a total demand of about 49,800 passengers per hour. This demand could not be accommodated by operational and surface improvements alone and therefore a new rapid transit 'relief' line connecting the Danforth subway to Union Station should be in place prior to completion of development in the Railway Lands.

(ii) Central Bayfront and Harbourfront

An L.R.T. line along the waterfront should be constructed in the near future, since better transit service will be needed to serve the Harbourfront and Central Bayfront office developments, the Island Ferry docks and Harbour Square condominiums. This L.R.T. line should extend from Union Station down Bay Street and along Queen's Quay to an off-street loop immediately east of Spadina Avenue. Implementation of this L.R.T. service would allow the remainder of the Harbourfront office development to be approved.

The service could be extended further west along Queen's Quay to Bathurst Street and then northerly to connect with the existing streetcar tracks at Fleet Street. This would provide a continuous rail transit link from Union Station serving the entire Harbourfront development and Exhibition Place which could ultimately be upgraded by providing grade separation with Lake Shore Boulevard. Alternatively, the service could be extended west of Bathurst Street along the south side of Lake Shore Boulevard to the Ontario Place/Exhibition Place area. A 10 m. transit right-of-way on Harbourfront lands along the west side of Bathurst Street north of Queen's Quay and along the south side of Lake Shore Boulevard to Stadium Road should therefore be protected.

(iii) Exhibition Place Area

A Waterfront I.C.T.S. facility will be required to provide a high capacity direct access from Union Station to the proposed international trade centre complex and Ontario Place. The I.C.T.S. would also serve the CN Tower, Convention Centre, Fort York and future development in the CN part of the Railway Lands. It will be necessary to provide a temporary yard facility for this line if it is built prior to the proposed downtown 'relief' line. As previously noted Metropolitan Council has approved a rapid transit feasibility study which will consider these two lines and terms of reference for this study are presently being prepared.

Transit service to the redeveloped Exhibition Place could further be enhanced by an improved Dufferin bus service extended into Exhibition Place. The provision of an off-street bus loop at Dufferin station together with reduced travel time (due to the elimination of the jog at Queen Street) and penetration into Exhibition Place would result in a more attractive service to and from the west.

In addition, the extension of Front Street between Bathurst Street and Strachan Avenue with direct ramp connections to and from Manitoba Drive would provide an opportunity to utilize Front Street for bus service into Exhibition Place, and thus increase transit capacity for major events.

(iv) Railway Lands

In order to accommodate the significant amount of transit trips generated by future office development in the western part of the Railway Lands and to divert trips from Harbourfront and the Central Bayfront area which would otherwise utilize the Yonge

and University subways, a Spadina L.R.T. line is required. The transit capacity offered by this service and the proposed Waterfront I.C.T.S. line (with a station at Spadina Avenue) would be sufficient to accommodate both the estimated transit demand and the latent auto demand which could not be handled on the improved road network. Depending on the exact staging of new development both in the downtown and Central Bayfront areas, it is almost certain that the rapid transit 'relief' line will be required prior to the complete development of the Railway Lands.

(9) Conclusions

On the basis of the assessment outlined above, an overall transportation plan has been developed and is shown on Figure 11. The various road and transit improvements required and their associated costs are summarized in Table 5. Regarding the alignment of the Waterfront I.C.T.S. and the ramps between the Front Street extension and the Gardiner Expressway, it should be stressed that these are deemed to be the best technical solutions given various Metropolitan and TTC objectives. The acceptability of these alignments however, will be subject to the results of detailed feasibility studies.

(a) Achievement of Study Objectives

This plan achieves the four study objectives outlined in section (3) of this report. While the need for individual transportation improvements cannot be exclusively attributed to specific developments, the essential improvements related to the achievement of these objectives are as follows:

(i) To maintain an adequate level of access for the Central Area and Financial District

The Front Street extension and widening of the Gardiner Expressway are the key road improvements required. The

TABLE 5

ROAD AND TRANSIT IMPROVEMENTS

INCLUDED IN THE CENTRAL WATERFRONT TRANSPORTATION PLAN

ROAD IMPROVEMENTS	Capital Cost (1983 dollars millions)
Lake Shore West Corridor	
. extension of Front Street from Bathurst Street to Strachan Avenue with direct ramps from Strachan Avenue to Manitoba Drive;	55 M
. construction of a new Gardiner Expressway interchange with the proposed Front Street Extension to serve trips to and from the west;	
. widening of the Gardiner Expressway to 4 lanes in each direction from the proposed Front Street interchange to the Humber River;	35 M
Northern Corridor	
. extension of Dufferin Street through Exhibition Place to Lake Shore Boulevard;	11 M
. elimination of the jog in Dufferin Street at Queen Street	
. reconstruction and widening of the Spadina Avenue bridge south of Front Street to accommodate 3 lanes in each direction and an L.R.T. facility;	5 M[1,2]
. reconstruction of Spadina Avenue from Front Street to Bloor Street to eliminate angle parking and provide r.o.w. for an L.R.T. line;	4 M
. widening of York Street to 3 lanes in each direction from Front Street to Queen's Quay;	Not Available
Internal Road Improvements	
. realignment and extension of Queen's Quay westerly to Stadium Road	Presently under construction
. provision of a continuous east-west 'spine' road through the Railway Lands from Bay Street to Bathurst Street;	Not Available

NOTES: 1. 1981 dollars, (Railway Lands Access Study - Phase II).
2. these facilities to be partially financed by private developers.

TABLE 5 (Cont'd.)

Internal Road Improvements (continued)	
. extension of Simcoe Street southerly from Front Street under the rail corridor to Queen's Quay	12 M[2,3]
. provision of a new section of John Street from the east-west 'spine' road southerly to Queen's Quay	Not Available[2]
. extension of Portland Street southerly from Front Street over the rail corridor to Queen's Quay	Not Available[2]
TRANSIT IMPROVEMENTS	
Central Bayfront and Harbourfront	
. construction of a new Harbourfront L.R.T. facility from Union Station south along Bay Street to Queen's Quay and then westerly along the realigned Queen's Quay to loop at Spadina Avenue;	29 M[4]
. protection of an exclusive transit right-of-way from Spadina Avenue within an increased Queen's Quay right-of-way to Bathurst Street and within the Harbourfront Lands along the west side of Bathurst Street and south side of Lake Shore Boulevard to Stadium Road;	-
Yonge Subway Relief	
. construction of a rapid transit 'relief' line from the Danforth subway in the vicinity of the Greenwood yards to Union Station	272 M[4] (excluding property)
I.C.T.S. Line	
. construction of a Waterfront I.C.T.S. line from Union Station through the Railway Lands to Exhibition Place including a temporary maintenance yard;	187 M[4] (excluding property)
Exhibition Place	
. provision of an off-street, fare paid bus loop at Dufferin Station and a new bus loop within Exhibition Place	1 M (excluding property)
Railway Lands	
. construction of a Spadina L.R.T. facility from Spadina station on the Bloor subway connecting to the proposed Harbourfront line on Queen's Quay;	41 M[4]

NOTES: 1. 1981 dollars, (Railway Lands Access Study - Phase II).
2. these facilities to be partially financed by private developers.
3. cost includes only railway under pass.
4. capital cost includes rolling stock.

ELIMINATION OF DUFFERIN ST. JOG

POSSIBLE CONSOLIDATION OF TRANSPORTATION FACILITIES

Queen St Mental Health Centre

EXHIBITION PLACE

STADIUM

ONTARIO PLACE

FORT YORK

To Exhibition Place and Ontario Place

ISLAND AIRPORT

CNR & CPR RAILWAY YARDS

SCALE 1:10,000 M

FIGURE II: CENTRAL WATER

SUBWAY EXISTING

I.C.T.S. LINE

DOWNTOWN 'RELIEF

L.R.T. LINE

EXISTING BUS ROU

IMPROVEMENTS TO

EXISTING STREETCA

TRANSIT RIGHT-OF

MAJOR PEDESTRIAN

METROPOLITAN TORONTO PLANNING DEPARTMENT
TRANSPORTATION DIVISION MAY 1983

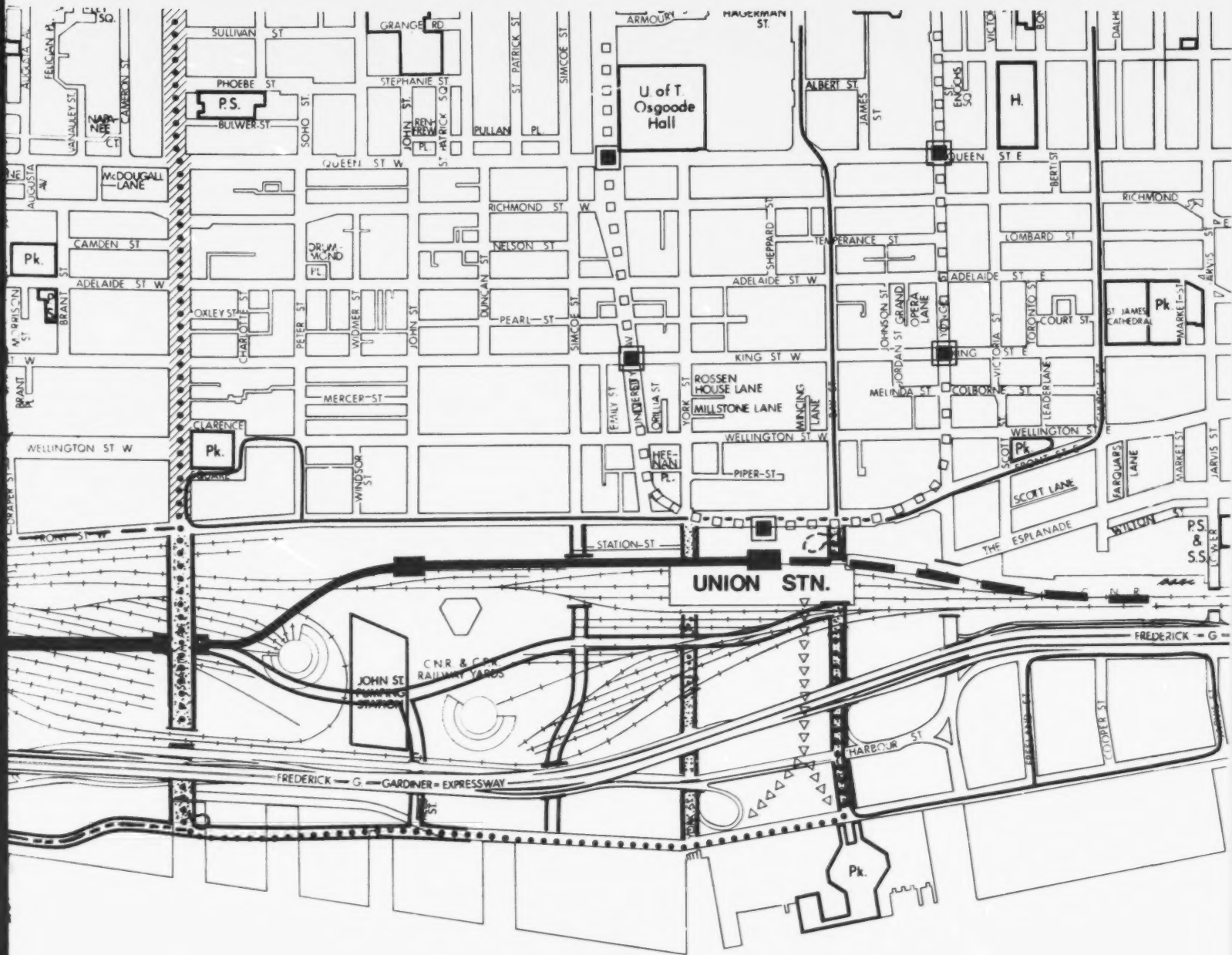


FIGURE II: CENTRAL WATERFRONT TRANSPORTATION PLAN

- SUBWAY EXISTING
- I.C.T.S. LINE
- DOWNTOWN 'RELIEF LINE'
- L.R.T. LINE
- EXISTING BUS ROUTES
- IMPROVEMENTS TO BUS SERVICE
- EXISTING STREETCAR ROUTES
- TRANSIT RIGHT-OF-WAY
- MAJOR PEDESTRIAN CONNECTIONS
- NEW ROADS
- ROAD WIDENINGS
- ROAD REDESIGN

NOTE:
THE ALIGNMENT OF THE I.C.T.S. LINE AND THE CONFIGURATION OF THE FRONT ST. INTERCHANGE WITH THE GARDINER EXPRESSWAY ARE THE PREFERRED TECHNICAL SOLUTIONS, BUT THEIR ACCEPTABILITY WILL BE SUBJECT TO THE RESULTS OF DETAILED FEASIBILITY STUDIES.

proposed new crossings of the main rail corridor at Portland Street and more importantly Simcoe Street and the widening of York Street south of Front Street would also help to maintain an adequate level of road service. Without these improvements, office development south of Front Street would generate sufficient vehicle trips to reduce the level of road service for downtown oriented trips to an unacceptable level. While GO transit can be expected to accommodate modest increases in commuter ridership, the key element in maintaining an adequate level of transit service to the Central Area will be the provision of a rapid transit 'relief' line from the Danforth subway to the Union Station area.

(ii) To improve public transit to serve the various Waterfront activities.

This objective would be satisfied by the construction of the Harbourfront LRT line from Union Station to Spadina Avenue and by the protection of a transit right-of-way from Spadina Avenue to Stadium Road primarily in the centre of Queen's Quay which would allow for the extension of this waterfront transit service.

(iii) To provide suitable access to an international trade centre and covered stadium complex at Exhibition Place

This will require the construction of a fully grade-separated rapid transit facility in addition to various road improvements to provide an acceptable level of service. The Waterfront I.C.T.S. line together with the improvements to Dufferin Street and the extension of Front Street with a direct connection to Manitoba Drive would fulfill this third objective.

(iv) To provide sufficient access to allow development of the Railway Lands and the remainder of Harbourfront

The Harbourfront LRT line provides the key link which would enable the remainder of the Harbourfront office development to proceed. While there is some uncertainty regarding the ability of the road elements of the plan to accommodate the full commercial development of the Railway Lands as proposed, the provision of a rapid transit 'relief' line, a Waterfront I.C.T.S. line as well as a Spadina LRT line should enable the proposed office development to take place in the Railway Lands. The coordinated staging of this development with the implementation of these rapid transit lines will be essential.

It should be noted that a number of improvements have been proposed outside the study area and these would have to be implemented in order for the plan to work. These improvements include: addition of 2 trains to the Yonge-University-Spadina subway; operation of a Sherbourne express bus with full transit priority; widening of the Bayview Avenue extension and improving its connections to King Street, Queen Street, Front Street and Eastern Avenue; upgrading of Jarvis Street; and upgrading of Bathurst Street north of Front Street.

(b) Relationship of the Transportation Plan to Future Office Development

As noted previously, the transit improvements shown on Figure 11 will be sufficient to accommodate approximately 2.4 million square metres of additional office space (as assumed for Development Level D); however, based on the modal splits assumed in this analysis, the road improvements recommended in this report would not be sufficient to allow the full development of the Railway Lands as proposed unless a transit modal split significantly higher than that assumed in this study is achieved. (79% as opposed to 71% on the average for new

development) With respect to the current Railway Lands proposal for approximately one million sq. m of office development, it should be noted that the CN part of the office development proposal is located further away from Union Station than the CP part and therefore more workers can be expected to travel by auto. As a result, development of the office space in the CN lands would contribute more to area road congestion than would CP office developments.

However, it should be noted that if the Spadina L.R.T. and the 'relief' and Waterfront I.C.T.S. lines were built, sufficient excess transit capacity would be available to accommodate the estimated number of auto person trips which could not be handled by the improved road network. The need for further major road improvements should therefore be determined by the rate and extent of development and the provision and utilization of major transit facilities. Accordingly, a carefully staged implementation plan for the development of the entire Railway Lands will be necessary. In this regard, a monitoring program should be developed in order to assist in evaluating, on an on-going basis, the impacts of additional auto and transit trips generated by new development in the downtown and Central Waterfront areas. If the necessary transit services are in place, the 79% transit modal split might very well be achieved and this would enable the full development as proposed to proceed. Conversely, if the road and transit improvements recommended in this report are not implemented, the Technical Transportation Planning Committee should be requested to report on what level of development can be reasonably serviced by the transportation system so that the City of Toronto can be advised to take any necessary action to decrease current and proposed zoning densities.

(c) Implementation of the Transportation Plan

Immediate action by Metropolitan and City of Toronto Councils is required to begin the implementation process for those major elements

of the plan which are required to accommodate development projects now under construction or those proposals for which official plan and zoning approvals have been obtained. These improvements include the following:

- Front Street extension from Bathurst Street to Strachan Avenue including ramp extensions to Manitoba Drive incorporating reserved bus lanes;
- Gardiner Expressway interchange with the proposed Front Street Extension;
- widening of the Gardiner Expressway from the proposed Front Street interchange to the Humber River;
- Dufferin Street extension to Lake Shore Boulevard;
- elimination of the jog in Dufferin Street at Queen Street;
- construction of a Harbourfront L.R.T. line from Union Station to Spadina Avenue via Bay Street and Queen's Quay including its extension to the existing streetcar system possibly via Spadina Avenue; and
- construction of a Waterfront I.C.T.S. line from Union Station to Exhibition Place (subject to the results of the downtown rapid transit line feasibility study).

While it is difficult at this time to determine the staging of the other elements of the plan, appropriate steps should now be taken, where possible, to protect the rights-of-way required. In many cases this will require official plan amendments, for instance to increase road right-of-way widths (e.g. York and Bay Streets).

With regard to new rapid transit facilities, it should be noted that an amendment to Figures 3, 5 and 7 of the Metropolitan Official Plan will be required to show the Harbourfront and Spadina L.R.T. lines. With respect to the Waterfront and 'relief' rapid transit lines, Metropolitan Council in adopting Clause No. 1 of Report No. 6 of the Economic Development and Planning Committee on April 26, 1983 approved the undertaking of a feasibility study which will consider both of these

lines. Terms of reference are now being prepared and the study should begin later this year. The appropriate time to consider official plan amendments for these lines would be following the completion of the feasibility study.

An important aspect of implementation of the Central Waterfront Transportation Plan will be the role of private developers in contributing to the cost of the various improvements. In this regard, developers should be requested to dedicate any required right-of-way (including that required for rapid transit stations and yard facilities) and to contribute to actual construction costs for the portion of the improvement serving their developments as a condition of approval of their rezoning applications. In this manner, the high cost of many of these road and transit projects can be reduced substantially.

(d) Compatibility with the Metropolitan Official Plan

Official Plan and Zoning commitments are in place for the majority of developments considered in this study. These committed developments were previously reviewed and found to be in conformity with the Metropolitan Official Plan. The major exception relates to the Railway Lands, for which the City of Toronto is currently preparing a Part II Plan, as required by the City's Part I Official Plan. The Part I Official Plan guidelines for the Part II Plan call for a maximum of 540,000 square metres of office space for the Railway Lands, to be concentrated east of John Street.

Marathon and CN Real Estate have recently submitted an application requesting Part II Plan and Zoning By-law amendments for the Railway Lands which would permit 1,080,000 square metres of office space, double the amount contemplated in the Part I Plan. They propose that half of this office space should be located in the eastern portion of the Railway Lands on sites owned or controlled by Marathon, the Federal

Government and the City, and the other half should be located west of John Street, as a commercial sub-centre focussed on Spadina Avenue, on lands owned by CN.

While recognizing that development in the Railway Lands cannot proceed until a Part II Plan is approved and that the Marathon/CN proposal has not been considered by City council, this report has assumed 1,030,000 square metres as a maximum amount of office development for the entire Railway Lands. This assumption is made only for the purpose of estimating a maximum transportation demand.

In estimating maximum transportation demand, it has been concluded that office development in the western portion of the Railway Lands, because of its distance from Union Station, would have to be serviced by new transit facilities. Even then, its relative distance from Union Station makes the western portion of the Lands less attractive with respect to transit accessibility than the eastern portion. Consequently, a particular level of office development in the CN lands around Spadina Avenue can be expected to generate more automobile traffic than a similar amount of office development in the eastern portion of the Lands.

With regard to the transportation facilities themselves, complete development of the Central Waterfront area would require the construction of a rapid transit 'relief' line which is already the subject of a feasibility study. The Waterfront rapid transit line by itself and the L.R.T. lines would be consistent with the transit philosophy of the Metropolitan Plan as detailed in Section 6, but amendments to Figures 3, 5 and 7 should be considered following the completion of the appropriate studies. Regarding road improvements, the Front Street extension and its connection to the Gardiner Expressway and the widening of the Gardiner to the Humber River are the major facilities which increase road capacity to the Central Area. While these road

improvements are absolutely essential for additional Central Waterfont developments, the benefit of this extra capacity will also help to sustain growth north of Front Street and, viewed in this broader context, are considered consistent with the Metropolitan Official Plan.